S E R V I C E M A N U A L

Model

1. PMCP642(NP-42H4B9)
2. PMCP650(NP-50H4D9)
3. PMCP660(NP-60H4G9)

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Service Manual Revision

Date	Description	By	Approved

C O N T E N T S

◆ SPECIFICATION

◆ ENGINEERING SPECIFICATION

◆ BLOCK DIAGRAM

◆ CIRCUIT

◆ EXPLODED VIEW

◆ CALIBRATION METHODS

◆ INSPECTION METHODS

◆ FIRMWARE UPGRADE METHOD

◆ SERIAL CONTROL PROTOCOLS

◆ TROUBLE SHOOTING

◆ PDP MODULE SERVICE MANUAL

Specifications for PDP Monitor(9-BNC)

Model : PMCP642(NP-42H4B9)
PMCP650(NP-50H4D9)
PMCP660(NP-60H4G9)

Main Features

- Pixelworks DNX™ (Digital Natural Expression) technology including
  Pixelworks DNX™ (Digital Natural Expression) technology
  dramatically enhances the quality of video images
  by combining multiple Pixelworks video processing technologies
  to deliver clear,natural-looking standard and high-definition video images.
  DNX technology combines sophisticated digital video processing techniques,
  advanced scaling,motion-adaptive deinterlacing,noise reduction,
  dynamic edge enhancement,and smoothing of moving lines to deliver a lifelike picture.
- High Brightness and High Contrast Ratio
- DVI(Digital Visual Interface) Support Up to 720p , 1080i , 1280x1024 / 60 Hz(SXGA),
- HDCP(High-bandwidth Digital Content Protection) Supported
- Multi-Standard RGB(PC) Monitor Support Up to 720p , 1080i , 1280x1024 / 60 Hz (SXGA),
- Multi-Standard Component Signal Compatibility : 480i , 576i , 480p , 576p , 720p , 1080i
- Multi-Standard Video System Supported : NTSC , PAL , SECAM
- Multi-screen display : Normal , PiP, PBP
- Variable Image size : Auto,Fill All(16:9),Fill Aspect,Zoom,Anamorphic,Wide
- Variable Picture control : Brightness , Contrast , Sharpness , Color , Tint
- Variable Audio control : Volume , Mute , Bass , Treble , Balance
- Video Enhancement features including
  - DCTI(Digital Chroma Transient) / DLTI(Digital Luminance Transient Improvement)
  - Digital luminance peaking and Horizontal Peaking
  - Enhanced sharpness controls
  - Advanced Noise Reduction including progressive sources
  - Flesh Tone Correction (FTC)
  - Chroma Upsampling Error (CUE) correction
  - Improved White and Black-level expansion
  - Digital 3D Comb-filter
  - Digital brightness, contrast, hue, and saturation control
  - PixelBoost™(Pixelworks) overdrive technology for video format
  - Improved scaler and filters for sharper images
  - Improved multi-region, anamorphic scaling for 4:3<->16:9 aspect ratio conversion
  - Independent vertical and horizontal scalers
  - True 10-bit(1 billion color) processing (Option)
- Deinterlacing features including
  - Improved deinterlacer, supporting SDTV and HDTV, for standard NTSC/PAL/SECAM,1080i
  - Per-pixel motion-compensated deinterlacing
  - Improved Low-Angle Interpolation
  - Film mode for 3:2/2:2 pull-down materials, including 1080i sources
- Audio Enhancement features including
  - Automatic Volume Correction (AVC)
  - Audio Delay for "Lip Sync" (Option)
  - Spatial Effects
  - Pseudo Stereo
- Multi-Language On Screen Display (OSD)
- Still image function
- Image Sticking Minimum Function
- Sleep Timer
- Close Caption support
- Ultra slim & light design

PDP Monitor

Item			Specifications		
			PMCP642 (NP-42H4B9)	**PMCP650** (NP-50H4D9)	**PMCP660** (NP-60H4G9)
Display	Screen Size(Active Area)		42" (920.1(H) x 518.4(V)±0.5mm	50" (1106.5(H) x 622.1(V)±0.5mm	60" (1319.6(H) x 741.9(V)±0.5mm
	Aspect ratio		16:9		
	Number of Pixels		1024 (H) x 768 (V)	1366 (H) x 768 (V)	1366 (H) x 768 (V)
	Pixel Pitch		0.900(H) x 0.676(V) [mm]	0.810(H) x 0.810(V) [mm]	0.966(H) x 0.966(V) [mm]
	Displayable Colors		1 billion (Option)		
	Brightness		1200 cd/㎡	1000 cd/㎡	1200 cd/㎡
	Contrast Ratio		8000:1	8000:1	7000:1
	Color Temperature		9500 K		
	Viewing Angle		Over 160 degrees		
In / Out Terminals	Speaker Output	Internal Speaker	10W(L) + 10W(R) [RMS] / 8Ω 2 Way 2 Speaker		
		External Speaker (Option)	10W(L) + 10W(R) [RMS] / 8Ω 2 Way 4 Speaker System		10W(L) + 10W(R) [RMS] / 8Ω 2 Way 6 Speaker System
	RS-232C	D-Sub Jack x 1 (9 pin)	TXD + RXD (1:1)		
	DVI Input	DVI Jack x 1 (24 pin)	Digital RGB : TMDS MAX : 720p , 1080i , 1280 x 1024 / 60 Hz (SXGA)		
		RCA Jack x 1	Audio : 0.5V[rms](Normal) / 2 Channel (L+R)		
	RGB Input	D-Sub Jack x 1 (15 pin)	Analog RGB : 0.7V[p-p](75Ω), H/CS/V : TTL (2.2 kΩ), SOG : 1V[p-p](75Ω) MAX : 720p , 1080i , 1280 x 1024 / 60 Hz (SXGA)		
		RCA Jack x 1	Audio : 0.5V[rms](Normal) / 2 Channel (L+R)		
	Component Input	RCA Jack x 1	Y:1V[p-p](75Ω) , Pb/Cb:0.7V[p-p](75Ω) , Pr/Cr:0.7V[p-p](75Ω) 480i , 576i , 480p , 576p , 720p , 1080i Audio : 0.5V[rms](Normal) / 2 Channel (L+R)		
	Monitor Output	BNC Jack x 1	Video : 1V[p-p] (75 Ω)		
		RCA Jack x 1	Audio : 0.5V[rms](Normal) / 2 Channel (L + R)		
	S-Video Input	Mini DIN Jack x1 (4 pin)	Y: 1V[p-p] (75 Ω) , C: 0.286V[p-p] (75 Ω) [NTSC] Y: 1V[p-p] (75 Ω) , C: 0.300V[p-p] (75 Ω) [PAL / SECAM]		
	Video Input	BNC Jack x 1	Video : 1V[p-p] (75 Ω) [NTSC / PAL / SECAM]		
		RCA Jack x 1	Audio : 0.5V[rms](Normal) / 2 Channel (L + R)		
	Video 1 , 2	RCA Jack x 2	Video : 1V[p-p] (75 Ω) Audio : 0.5V[rms](Normal) / 2 Channel (L+R)		
General	Power Supply		AC 100V ~ 240V, 50/60Hz		
	Power Consumption (Typical)		350W	450W	610W
	Dimensions (Without Stand) [W mm x H mm x D mm]		1028 x 625 x 107.4	1206.7 x 721 x117.3	1454 x 876 x 94.1
	Weight (Without Stand)		30 kg	42 kg	67.3 kg
Environment Condition	Temperature	Operational	0 ~ 40 ℃		
		Storage	-20 ~ 60 ℃		
	Humidity	Operational	20 ~ 80% RH (No condensation)		
		Storage	10 ~ 90% RH (NO condensation)		
	Pressure	Operational	800 ~ 1100 hPa (Altitude : 0 ~ 2,000 m)		
		Storage	700 ~ 1100 hPa (Altitude : 0 ~ 3,000 m)		

** The specifications are subject to change without notice*

External Speaker (Option)

Item	Specifications		
	42"	50"	60"
Dimensions (W x H x D)	113 mm x 626.6 mm x 82.2 mm	90 mm x 721 mm x 68 mm	1452mm x 123mm x 86.8mm
Weight	5 kg (L + R)	3 kg (L + R)	5 kg (L + R)
Type	2 Way 4 Speaker System		2 Way 6 Speaker System
Input	10 W (RMS)		
Impedence	8 Ω		
Output Sound Pressure	87 dB/W/M		
Frequency Response	45 Hz ~ 20 KHz		

** The specifications are subject to change without notice*

Internal Speaker

Item	Specifications		
	42"	50"	60"
Type	2 Way 2 Speaker		
Input	10 W (RMS)		
Impedence	8 Ω		
Output Sound Pressure	88 dB/W/M		
Frequency Response	170 Hz ~20 KHz		

** The specifications are subject to change without notice*

Accessories

Standard	Owner's Instruction , Remote Controller/AAA Batteries , Power Cord
Option	Foot Stand , Table-Top stand , Wall-Mount Bracket , Ceiling-Mount Bracket , Internal Speaker System , External Speaker System , DVI Cable , VGA(D-SUB) Cable , Audio Cable , Component Cable , RCA Video Cable , RCA Audio Cable , S-Video Cable ,

** The specifications are subject to change without notice*

Woosung Nextier Corp.

Engineering Products Specification

MODEL

1. PMCP642(NP-42H4B9)
2. PMCP650(NP-50H4D9)
3. PMCP660(NP-60H4G9)

PDP MONITORs

■Preliminary ☐Approved

Woosung Nextier Corp.	_____
DATE : _____	**DATE :** _____

PELCO Ver.1.2 11/24/06
By Tommy Shin

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1. SCOPE

1.1 Introduction	
Product configuration	This specification defines the configuration and performance requirements for the following Plasma Displays.
Plasma Displays	Product Name : PDP monitors Display Type : 42” HD / 50” HD / 60” HD Model Name : PMCP642 (NP-42H4B9), PMCP650 (NP-50H4D9), PMCP660 (NP-60H4G9)
1.2 Product Definition	
Top Level Assembly	The top level assembly shall contain : 1. Plasma Display : PMCP642 (NP-42H4B9), PMCP650 (NP-50H4D9), PMCP660 (NP-60H4G9) 2. Power Cord(USA & Europe) 3. RGB Cable 4. DVI Cable 3. Remote Control Unit 4. “AAA” Batteries n=2 5. Installation/Operation Manual 6. Foot Stand
	Optional Accessories
	1. S-Video Cable 2. PC Audio Cable 3. Wall Mount Bracket 4. Wall Mount Bracket(Tilt Capable)

1.3 Mass Production Release	
Mass Production Approval	Mass Production shall not begin until Woosung Nextier Corp. has issued a Mass Production Release.
Component Approvals	All exterior plastic components, screen printed components, labels, shipping cartons, protective foam, and printed materials require approval by Woosung Nextier Corp. prior to Mass Production Release.
1.4 Change Control	
ECR/ECN	All Engineering changes to the product shall be made in accordance with the Woosung Nextier Corp. ECR/ECN Procedure.
1.5 Service	
Documentation / Service Manual	Complete Spare Parts List, Schematic, Service Manual, and Assembly Drawings shall be provided within one month of Mass Production Release.

2. GENERAL SPECIFICATION

2.1 General Specification			
Display Type	42”HD	50”HD	60”HD
Model Name	PMCP642 (NP-42H4B9)	PMCP650 (NP-50H4D9)	PMCP660 (NP-60H4G9)
Native Resolution & Frequency	1024 X 768 @ 60Hz	1366 X 768 @ 60Hz	1366 X 768 @ 60Hz
Input Voltage	AC100V ~ 240V, 50/60Hz	AC100V ~ 240V, 50/60Hz	AC100V ~ 240V, 50/60Hz
2.2 Input/Output Terminal			
DVI Input	DVI-D 24-pin Jack × 1 RCA Jack(L+R) × 1		
RGB Input	D-Sub 15-pin Jack ×1 RCA Jack(L+R) × 1		
Component Input	RCA(YPbPr/YCbCr) Jack × 1 RCA(L+R) Jack × 1		
S-Video Input	Mini DIN S-terminal × 1		
Video Input	BNC Jack × 1 RCA Jack(L+R) × 1		
Video1, 2 Input	RCA Jack × 2		
Monitor Output	BNC Jack × 1 RCA Jack(L+R)× 1		
RS-232C	D-Sub 9-pin Jack × 1		

3. INPUT SIGNAL INTERFACE

3.1 DVI Interface	
DVI Input Connector	DVI Female Contacts
Audio Input Connector	RCA (L+R) Jack
DVI Video Cable Connector Pin out	Pin 1 TMDS Data 2- Pin 2 TMDS Data 2+ Pin 3 TMDS Data 2/4 Shield Pin 4 NC Pin 5 NC Pin 6 DDC Clock Pin 7 DDC Data Pin 8 NC Pin 9 TMDS Data 1- Pin 10 TMDS Data 1+ Pin 11 TMDS Data 1/3 Shield Pin 12 NC- Pin 13 NC Pin 14 +5V Power Pin 15 Ground (+5V) Pin 16 Hot Plug Detect Pin 17 TMDS Data 0- Pin 18 TMDS Data 0+ Pin 19 TMDS Data 0/5 Shield Pin 20 NC Pin 21 NC Pin 22 TMDS Clock Shield Pin 23 TMDS Clock - Pin 24 TMDS Clock +
Sync Signals	Digital, Differential type (TMDS)
DVI Audio Input Level	0.5V[rms] (L+R)
DDC 1/2B	Ver. 1.2

3.2 RGB Interface	
RGB Input Connector	D-Sub 15-Pin Jack (Female)
Audio Input Connector	RCA (L+R) Jack
D-Sub 15-Pin Cable Connector Pin out	Pin 1 Red analog Signal Pin 2 Green analog Signal Pin 3 Blue analog Signal Pin 4 GND Pin 5 GND Pin 6 GND for Red signal Pin 7 GND for Green signal Pin 8 GND for Blue signal Pin 9 NC Pin 10 GND Pin 11 GND Pin 12 SDA (Input only) Pin 13 H-Sync or composited H/V Sync Signal Pin 14 V-Sync Pin 15 SCL (Input only)
RGB Signals	700 mV full scale
RGB Signal Impedance	75 Ohms
RGB Audio Input Level	0.5V[rms] (L+R)
RGB Sync Signals	TTL 2.2k ohm internal pull-up resistors.
DDC 1/2B	Ver 1.1

3.3 DVI / RGB Mode Table					
Mode	Resolution	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	Pixel Clock Frequency (MHz)	Remark
VGA	720 x 400	31.469	70.000	28.320	Support
	640 x 480	31.460	50.000	25.170	Support
		31.500	60.000	25.175	Support
		37.700	72.000	31.500	Support
		37.500	75.000	31.500	Support
		43.300	85.000	36.000	Support
SVGA	800 x 600	35.100	56.000	36.000	Support
		37.900	60.000	40.000	Support
		48.100	72.000	50.000	Support
		46.900	75.000	49.500	Support
		53.700	85.000	56.250	Support
XGA	1024 x 768	48.400	60.000	65.000	Support
		56.500	70.000	75.000	Support
		60.000	75.000	78.750	Support
		64.000	80.000	85.500	Support
		68.300	85.000	94.500	Support
SXGA	1280 x 1024	64.000	60.000	108.000	Support
WXGA	1366 x 768	50.000	60.000	84.400	Support
SDTV 480p	720 x 480	31.470	59.940	27.000	Support
SDTV 575p	720 x 576	31.250	50.000	27.000	Support
HDTV 720p	1280 x 720	45.000	60.000	74.250	Support
		44.960	59.940	74.180	Support
		37.500	50.000	74.250	Support
HDTV 1080i	1920 x 1080	33.750	30.000	74.250	Support
		33.720	29.970	74.180	Support
		31.250	25.000	74.250	Support
		28.125	25.000	74.250	Support

3.4 Component Interface	
Component Input Connector	RCA(YPbPr/YCbCr) Jack
Audio Input Connector	RCA(L+R) Jack
Component Signal	Y : 1V[p-p] Pb/Cb : 0.7V[p-p] Pr/Cr : 0.7V[p-p]
Component Signal Impedance	75 Ohms
Audio Input	0.5[rms] (L+R)
Audio Input Impedance	470K Ohms
Component Signal Type	EDTV : 525i(480i), 625i(576i) SDTV : 625p(576p), 525p(480p) HDTV : 750p(720p), 1125i(1035i, 1080i)

3.5 Component Mode Table

Mode	Resolution	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	Pixel Clock Frequency (MHz)	Remark
EDTV 480i	720 x 480	15.730	29.970	13.5000	Support
EDTV 576i	720 x 576	15.630	25.000	13.5000	Support
SDTV 480p	720 x 480	31.470	59.940	27.000	Support
SDTV 576p	720 x 576	31.250	50.000	27.000	Support
HDTV 720p	1280 x 720	45.000	60.000	74.250	Support
		44.960	59.940	74.180	Support
		37.500	50.000	74.250	Support
HDTV 1080i	1920 x 1080	33.750	30.000	74.250	Support
		33.720	29.970	74.180	Support
		31.250	25.000	74.250	Support
		28.125	25.000	74.250	Support

3.6 S-Video Interface		
S-Video Input Connector		Mini DIN4-pin
S-Video Signal		Y : 1V[p-p] C : 0.286V[p-p] (NTSC) C : 0.3V[p-p] (PAL/SECAM)
S-Video Signal Impedance		75 Ohms
3.7 Video Interface		
Video Input Connector	Video Input	BNC Jack
	Video 1, 2 Input	RCA(Video) Jack
Monitor Output Connector		BNC Jack
Audio Input Connector		RCA(L+R) Jack
Audio Output Connector		RCA(L+R) Jack
Video Input Signal		V : 1V[p-p]
Video Output Signal		V : 1V[p-p]
Audio Input Level		0.5[rms] (L+R)
Audio Output Level		0.5[rms] (L+R)
Video Input Signal Impedance		75 Ohms
Video Output Signal Impedance		75 Ohms
Audio Input Impedance		470K Ohms
Audio Output Impedance		220K Ohms

4. POWER

4.1 42”HD Power Supply

4.1.1 Power Supply(SMPS)	
Model Name	PMCP642 (NP-42H4B9)
Input Voltage Range	AC 100 ~ 240V
Input Frequency Range	50/60 Hz(±3Hz)
Inrush Current	40A peak Max
Efficiency	83% Minimum ,AC220V ,At Full load
Power Consumption	Typical : 350W Standby : 7 W

4.1.2 DC Output

	Output Name	Output Current(A)		Output Typical	Voltage Tolerance (%)	Remark
		Min.	Max.			
Vsc Board (Signal Interface)	5V Stand_by	0.03A	1.0A	5.0V DC	±5	
	5Vsc	0.5A	4.5A	5.0V DC	±5	
	9Vsc	0A	2.0A	9.0V DC	±5	
	12Vsc	0A	1.0A	12.0V DC	±5	
	24V(audio-amp)	0A	2.5A	24.0V DC	±12	
PDP Module	5Vctrl	0.5A	4.5A	5.0V DC	±5	
	Va	0.005A	2.0A	60V DC	±1	
	Vs	0.1A	1.5A	180V DC	±1	

4.1.3 Connector

Connector No.	Description	Pin No.	Description	Pin No.	Description
CN801	VSC Board (Control Power)	1	ACD	5	Vs ON
		2	RLY ON	6	5VD
		3	5Vst_by	7	NC
		4	GND (DET)		
CN804		1	9Vsc	6	5Vsc
		2	9Vsc	7	GND
		3	GND	8	GND
		4	5Vsc	9	GND
		5	5Vsc		
CN802	AMP POWER	1	30V or 24V	3	GND
		2	30V or 24V	4	GND

4.2 50” Power Supply

4.2.1 Power Supply(SMPS)	
Model Name	PMCP650 (NP-50H4D9)
Input Voltage Range	AC 100 ~ 240V
Input Frequency Range	50/60 Hz(±3Hz)
Inrush Current	40A peak Max
Efficiency	83% Minimum ,AC220V ,At Full load
Power Consumption	Typical : 450W Standby : 7 W

4.2.2 DC Output

	Output Name	Output Current(A)		Output Typical	Voltage Tolerance (%)	Remark
		Min.	Max.			
Vsc Board (Signal Interface)	5V Stand_by	0.03A	1.0A	5.0V DC	±5	
	5Vsc	0.5A	4.5A	5.0V DC	±5	
	9Vsc	0A	2.0A	9.0V DC	±5	
	12Vsc	0A	1.0A	12.0V DC	±5	
	12Vfan	0A	0.6A	12.0V DC	±5	
	24V(audio-amp)	0A	1.75A	24.0V DC	±12	
PDP Module	5Vctrl	2.0A	5.0A	5.0V DC	±5	
	Va	0.005A	2.4A	60V DC	±1	
	Vs	0.1A	2.2A	195V DC	±1	

4.2.3 Connector

Description	Connector No.	Pin No.	Description	Pin No.	Description
Vsc Board (Signal Interface)	CN801	1	ACD	5	Vs ON
		2	RLY ON	6	5VD
		3	5Vst_by	7	NC
		4	GND (DET)		
	CN804	1	9Vsc	6	5Vsc
		2	9Vsc	7	GND
		3	GND	8	GND
		4	5Vsc	9	GND
		5	5Vsc		
	CN802	1	30V or 24V	3	GND
		2	30V or 24V	4	GND

4.3 60” Power Supply

4.3.1 Power Supply(SMPS)	
Model Name	PMCP660 (NP-60H4G9)
Input Voltage Range	AC 100 ~ 240V
Input Frequency Range	50/60 Hz(±3Hz)
Inrush Current	50A peak Max
Efficiency	85% Minimum ,AC220V ,At max load
Power Consumption	Typical : 610W Standby : 7 W

4.3.2 DC Output

	Output Name	Output Current(A)		Output Typical	Voltage Tolerance (%)	Remark
		Min.	Max.			
Vsc Board (Signal Interface)	5V Stand_by	0.03A	1.0A	5.0V DC	±5	
	5Vsc	0A	4.5A	5.0V DC	±5	
	9Vsc	0A	2.0A	9.0V DC	±5	
	12Vsc	0A	2.0A	12.0V DC	±5	
	24V(audio-amp)	0A	1.5A	24.0V DC	±12	
PDP Module	5Vctrl	4.5A	8.0A	5.0V DC	±5	
	Va	0.05A	2.7A	60V DC	±1	
	Vs	0.1A	3.0A	190V DC	±1	

4.3.3 Connctor

Description	Connector No.	Pin No.	Description	Pin No.	Description
VSC Board (Signal Interface)	P801	1	GND	5	STBY-5V
		2	5VD	6	RL-ON
		3	VS-ON	7	ACD
		4	AUTO-ON(DET)		
	P803	1	GND	7	5Vsc
		2	GND	8	5Vsc
		3	12V	9	GND
		4	12V	10	GND
		5	GND	11	9Vsc
		6	GND	12	9Vsc

Description	Connector No.	Pin No.	Description	Pin No.	Description
VSC Board (Signal Interface)	C806	1	24V	5	9Vsc
		2	24V	6	9Vsc
		3	GND	7	GND
		4	GND	8	GND
FAN	P802	1	GND	6	5Vsc
		2	12V	7	GND
		3	GND	8	GND
		4	9Vsc	9	24V
		5	GND	10	24V

5. CONTROLS AND INDICATORS

5.1 Hardware Controls	
Main Power Switch	None
LED	Power / Standby : Red Operation Lamp : Green No signal condition : LED is blinking
Controls Switch	Input Menu VOL－ VOL+ ▼ ▲ Power
Infrared Receiver	Arrival Distance : Min. 7m Resonance Frequency : 38 KHz
5.2 Remote Control	
Distance	7 m
Angle	30 degrees angle on each side of the sensor

5.3 Menu Controls		
Component/ Video / S-Video Input	Image	Brightness, Contrast, Phase, Sharpness, Color, Tint, Video Defaults
	Screen	Size, Freeze, Pixel Shift
	Setup	Language, Sleep Timer, OSD Setting(Menu Transparency, Menu Timeout) , Color Temp.
	Audio	Volume, Treble, Bass, Balance, Mute, Audio Defaults
RGB Input	Image	Brightness, Contrast, Phase, Frequency, Sharpness, Video Defaults
	Screen	Size, H Position, V Position, Auto Positioning, Freeze, Pixel Shift
	Setup	Same above
	Audio	Same above
DVI Input	Image	Brightness, Contrast, Sharpness, Video Defaults
	Screen	Size, Freeze, Pixel Shift
	Setup	Same above
	Audio	Same above

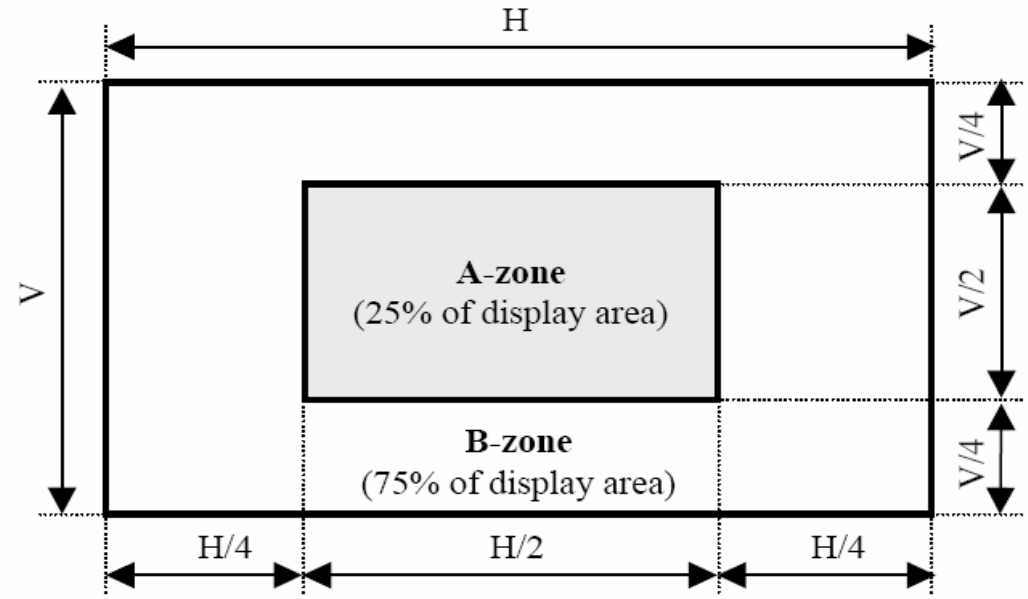
6. PLASMA DISPLAY PANEL(PDP) SPECIFICATIONS

6.1 42” HD Specification	
Panel Type	42X3
Number of Pixels	1024(H) × 768(V) (1pixel=3 RGB cells)
Pixel Pitch	0.900 mm (H) × 0.676 mm (V)
Cell Pitch	0.300 mm (H) × 0.676 mm (V)(Green Cell basis)
Display Area	921.5mm (H) × 519.0mm (V) ± 0.5mm
Outline Dimension	1005(H) × 597(V) × 60.7(D) ± 1mm
Pixel Type	RGB Closed type
Number of Gradations	(R)1024 × (G)1024 × (B)1024
Aspect Ratio	16:9
Peak Brightness	Typical 1,200cd/㎡
Contrast Ratio(in Dark Room)	Typical 8,000:1
Expected Life-time	More than 60,000 Hours of continuous operation
6.2 50” HD Specification	
Panel Type	50X3
Number of Pixels	1366(H) × 768(V) (1pixel=3 RGB cells)
Pixel Pitch	0.810 mm (H) × 0.810 mm (V)
Cell Pitch	0.270 mm (H) × 0.810 mm (V)(Green Cell basis)
Display Area	1106.5mm (H) × 622.1mm (V) ± 0.5mm
Outline Dimension	1190(H) × 700(V) × 58(D) ± 1mm
Pixel Type	RGB Closed (Well)type
Number of Gradations	(R)1024 × (G)1024 × (B)1024
Aspect Ratio	16:9
Peak Brightness	Typical 1,000cd/㎡
Contrast Ratio(in Dark Room)	Typical 8,000:1
Expected Life-time	More than 60,000 Hours of continuous operation

6.3 60” HD Specification	
Panel Type	60X6
Number of Pixels	1366(H) × 768(V) (1pixel=3 RGB cells)
Pixel Pitch	0.966 mm (H) × 0.966 mm (V)
Cell Pitch	0.322 mm (H) × 0.966 mm (V)(Green Cell basis)
Display Area	1319.6mm (H) × 741.9mm (V) ± 0.5mm
Outline Dimension	1408(H) × 828(V) × 60(D) ± 1mm
Pixel Type	RGB Closed (Well)type
Number of Gradations	(R)256 × (G)256 × (B)256
Aspect Ratio	16:9
Peak Brightness	Typical 1,000cd/㎡
Contrast Ratio(in Dark Room)	Typical 6,000:1
Expected Life-time	More than 45,000 Hours of continuous operation

7. Display Cell Defect Specifications

7.1 42” HD Cell Defect Specification



Defect	Specification		
	Number of Cell Defects (N)		Distance between two defects (D)
Non-Ignition Dot☞1) + Unstable Dot ☞2)	A-zone	▶ Total N ≤ 2 [cells / full screen] ▶ N ≤ 2 [cells / each R,G,B screen] ▶ N ≤ 2 [adjacency of 2-cells / full-white screen]	▶ D : ≥ 25mm, N≤1
	B-zone	▶ Total N ≤ 6 [cells / full screen] ▶ N ≤ 5 [cells / each R,G,B screen] ▶ N ≤ 2 [adjacency of 2-cells / full-white screen] = 0 [adjacency of 3-cells / full-white screen]	
Uncontrollable Dot ☞3)	A-zone	▶ N ≤ 0 [cells/each R,G,B screen]	
	B-zone	▶ Total N ≤ 2 [cells / full screen]	
Non-Extinguishing Dot ☞4)	A-zone	▶ N = 0	
	B-zone	▶ N = 0	
▶ Total sum of all defects N ≤ 10 [cells / full-white screen]			

☞**1) Non-Ignition Dot**(Dark Defect) is defined as “A cell of which more than 50% area is not ignited”

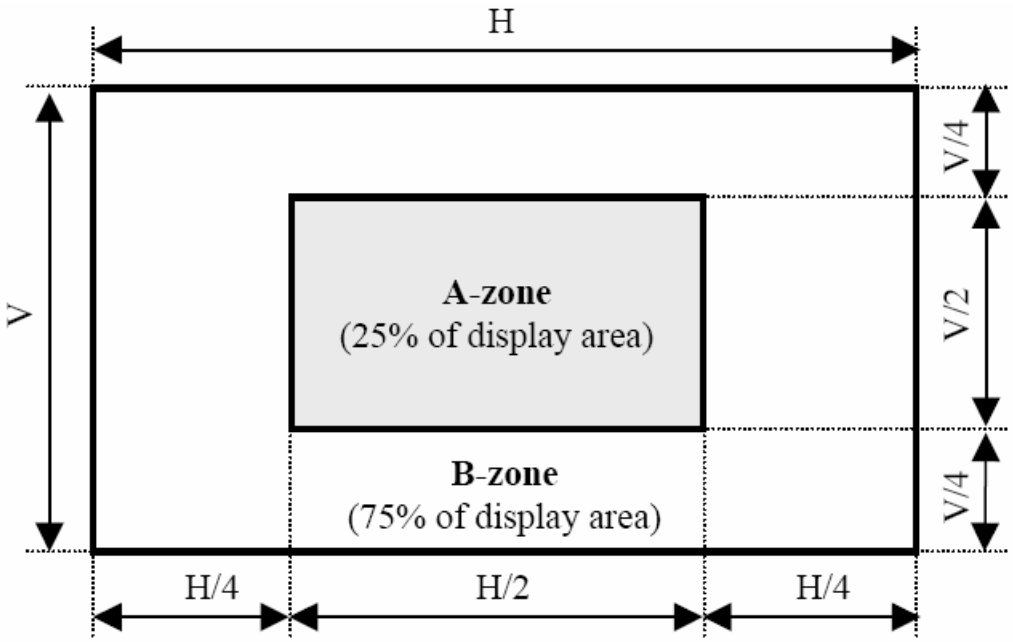
☞**2) Unstable Dot** (Flickering) is defined as “A cell which repeats On and Off”

☞**3) Uncontrollable Dot** is defined as “A cell which is distinctly brighter or darker than other cells around it” and/or “A cell of which color is distinctly different from that of other cells around it”

☞**4) Non-Extinguishing Dot** (brightness defect) is defined as “A cell of which more than 50% area is always ON”

* The decision distance is 3H away from the panel, intensity of illumination is between 100 Lux and 200 Lux.

7.2 50” HD Cell Defect Specification



Defect	Specification		
	Number of Cell Defects (N)		Distance between two defects (D)
Non-Ignition Dot☞1) + Unstable Dot ☞2)	A-zone	▶ N ≤ 4 [cells / full-white screen] ▶ N ≤ 2 [adjacency of 2-cells / full-white screen] = 0 [adjacency of 3-cells / full-white screen]	▶ N ≤ 1 [cells / 25mm-diameter-circle / full-white screen] for A/B-zone ☞ The defect of adjacent 2-cells is defined as one defect.
	B-zone	▶ N ≤ 11[cells / full-white screen] ▶ N ≤ 2 [adjacency of 2-cells / full-white screen] = 0 [adjacency of 3-cells / full-white screen]	
Uncontrollable Dot ☞3)	A-zone	▶ N ≤ 2 [cells / full-white screen]	
	B-zone	▶ N ≤ 3 [cells / full-white screen]	
Non-Extinguishing Dot ☞4)	A-zone	▶ N = 0 [cells / full-black screen]	
	B-zone	▶ N = 0 [cells / full-black screen]	
▶ Total sum of all defects N ≤ 18 [cells / full-white screen]			
Stain ☞5)	▶ N ≤ 6 , for the stain of which longer-axis length is 5mm or shorter. ▶ N = 0 , for the stain of which longer-axis length is longer than 5mm.		▶ D ≥ 50 mm

☞**1) Non-Ignition Dot**(Dark Defect) is defined as “A cell of which more than 50% area is not ignited”

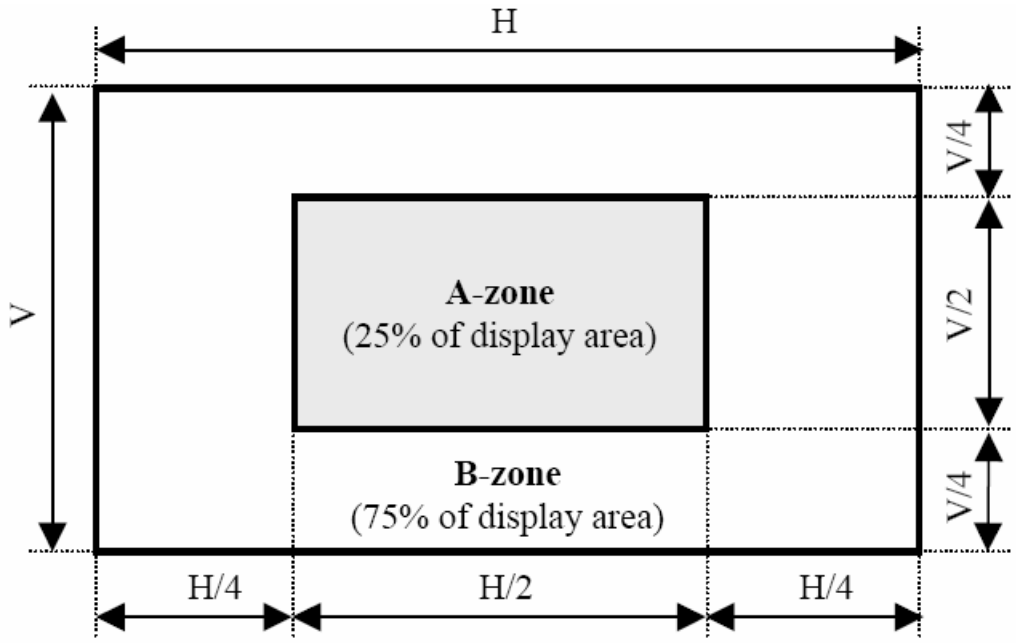
☞**2) Unstable Dot** (Flickering) is defined as “A cell which repeats On and Off”

☞**3) Uncontrollable Dot** is defined as “A cell which is distinctly brighter or darker than other cells around it” and/or “A cell of which color is distinctly different from that of other cells around it”

☞**4) Non-Extinguishing Dot** (brightness defect) is defined as “A cell of which more than 50% area is always ON”

☞**5) Stain** is defined as “A blob due to local color contamination in white or simple color pattern”

7.3 60” HD Cell Defect Specification



❑ **Cell Defect Specifications**

Defect	Specification		
	Number of Cell Defects (N)		Distance between two defects (D)
Non-Ignition Dot☞1) + Unstable Dot ☞2)	A-zone	▶ N ≤ 4 [cells / full-white screen] ▶ N ≤ 2 [adjacency of 2-cells / full-white screen] = 0 [adjacency of 3-cells / full-white screen]	▶ N ≤ 1 [cells / 25mm-diameter-circle / full-white screen] for A/B-zone ☞ The defect of adjacent 2-cells is defined as one defect.
	B-zone	▶ N ≤ 11[cells / full-white screen] ▶ N ≤ 2 [adjacency of 2-cells / full-white screen] = 0 [adjacency of 3-cells / full-white screen]	
Uncontrollable Dot ☞3)	A-zone	▶ N ≤ 3 [cells / full-white screen]	
	B-zone	▶ N ≤ 4 [cells / full-white screen]	
Non-Extinguishing Dot ☞4)	A-zone	▶ N = 0 [cells / full-black screen]	
	B-zone	▶ N = 0 [cells / full-black screen]	
▶ Total sum of all defects N ≤ 18 [cells / full-white screen]			

☞**1) Non-Ignition Dot**(Dark Defect) is defined as “A cell of which more than 50% area is not ignited”
☞**2) Unstable Dot** (Flickering) is defined as “A cell which repeats On and Off”
☞**3) Uncontrollable Dot** is defined as “A cell which is distinctly brighter or darker than other cells around it” and/or “A cell of which color is distinctly different from that of other cells around it”
☞**4) Non-Extinguishing Dot** (brightness defect) is defined as “A cell of which more than 50% area is always ON”
☞**5) Stain** is defined as “A blob due to local color contamination in white or simple color pattern”

8. MECHANICAL

8.1 Fan			
Model Name	PMCP642 (NP-42H4B9)	PMCP650 (NP-50H4D9),	PMCP660 (NP-60H4G9)
Fans	N/A (No Fans are used in the unit)		3EA(2400RPM)
8.2 Dimensions(without stand)			
Model Name	PMCP642 (NP-42H4B9)	PMCP650 (NP-50H4D9),	PMCP660 (NP-60H4G9)
Width	1028mm	1206.7mm	1454mm
Height	625mm	721mm	876mm
Depth	107.4mm	117.3mm	94.1mm
8.3 Weight(without stand)			
Model Name	PMCP642 (NP-42H4B9)	PMCP650 (NP-50H4D9),	PMCP660 (NP-60H4G9)
Net Weight	30Kg	42Kg	67.3Kg

9. ENVIRONMENTAL

9.1 42”HD Environmental Condition	
Operating Temperature Range	0°C to +40°C
Storage Temperature	-20°C to 60°C (Packing condition)
Operating Relative Humidity	20% to 80% (Non-Condensing)
Storage Relative Humidity	10% to 90% (Non-Condensing)
Operating Atmospheric Pressure	800~1100hpa (Altitude : 0 ~ 2,000 m)
Storage Atmospheric Pressure	700~1100hpa (Altitude : 0 ~ 3,000 m)
9.2 50”HD Environmental Condition	
Operating Temperature Range	0°C to +40°C
Storage Temperature	-20°C to 60°C (Packing condition)
Operating Relative Humidity	20% to 80% (Non-Condensing)
Storage Relative Humidity	10% to 90% (Non-Condensing)
Operating Atmospheric Pressure	800~1100hpa (Altitude : 0 ~ 2,000 m)
Storage Atmospheric Pressure	700~1100hpa (Altitude : 0 ~ 3,000 m)
9.3 60”HD Environmental Condition	
Operating Temperature Range	0°C to +40°C
Storage Temperature	-20°C to 60°C (Packing condition)
Operating Relative Humidity	20% to 80% (Non-Condensing)
Storage Relative Humidity	10% to 90% (Non-Condensing)
Operating Atmospheric Pressure	800~1100hpa (Altitude : 0 ~ 2,000 m)
Storage Atmospheric Pressure	700~1100hpa (Altitude : 0 ~ 3,000 m)

10. PACKAGING

10.1 Package Specifications			
Model Name	PMCP642 (NP-42H4B9)	PMCP650 (NP-50H4D9),	PMCP660 (NP-60H4G9)
Ink	The ink shall not rub off after a suitable drying time.		
Shipping Carton Type	One Piece Construction		
Carton Material	Double Wall Vertical Flute 16kg/cm2 burst strength.		
Handle	Cartons shall incorporate four holes on sides sides for handling.		
Width	1140mm	1380mm	1620mm
Height	715mm	880mm	1140mm
Depth	365mm	365mm	472mm
Gross Weight	36Kg	49Kg	78.3Kg
10.2 Vibration			
	X	Y	Z
Vibration Frequency	5 ~ 100Hz		
Acceleration	2.0G		
Test Time	30minutes	30minutes	60minutes
Test Condition	1.Frquence : 5Hz~100Hz 2.Axis of the Test : X, Y, Z 3.Check time : After the test 4.Product Condition : Package		
-Interior Check : Breakaway or break in wire. Damage in parts. Crack in PCB pattern or cold solder, unscrew, movement of power related components - No operation error in RGB mode, DVI mode, audio out after test.			
10.3 Drop			
Model Name	PMCP642 (NP-42H4B9)	PMCP650 (NP-50H4D9),	PMCP660 (NP-60H4G9)
Height	25cm(30kg~40kg)	20cm(40kg~50kg)	15cm(50kg~100kg)
1 angle 3 edge 6 surface—total 10time Drop test ※ With packing and Non-Operation			

11. AUDIO SYSTEM

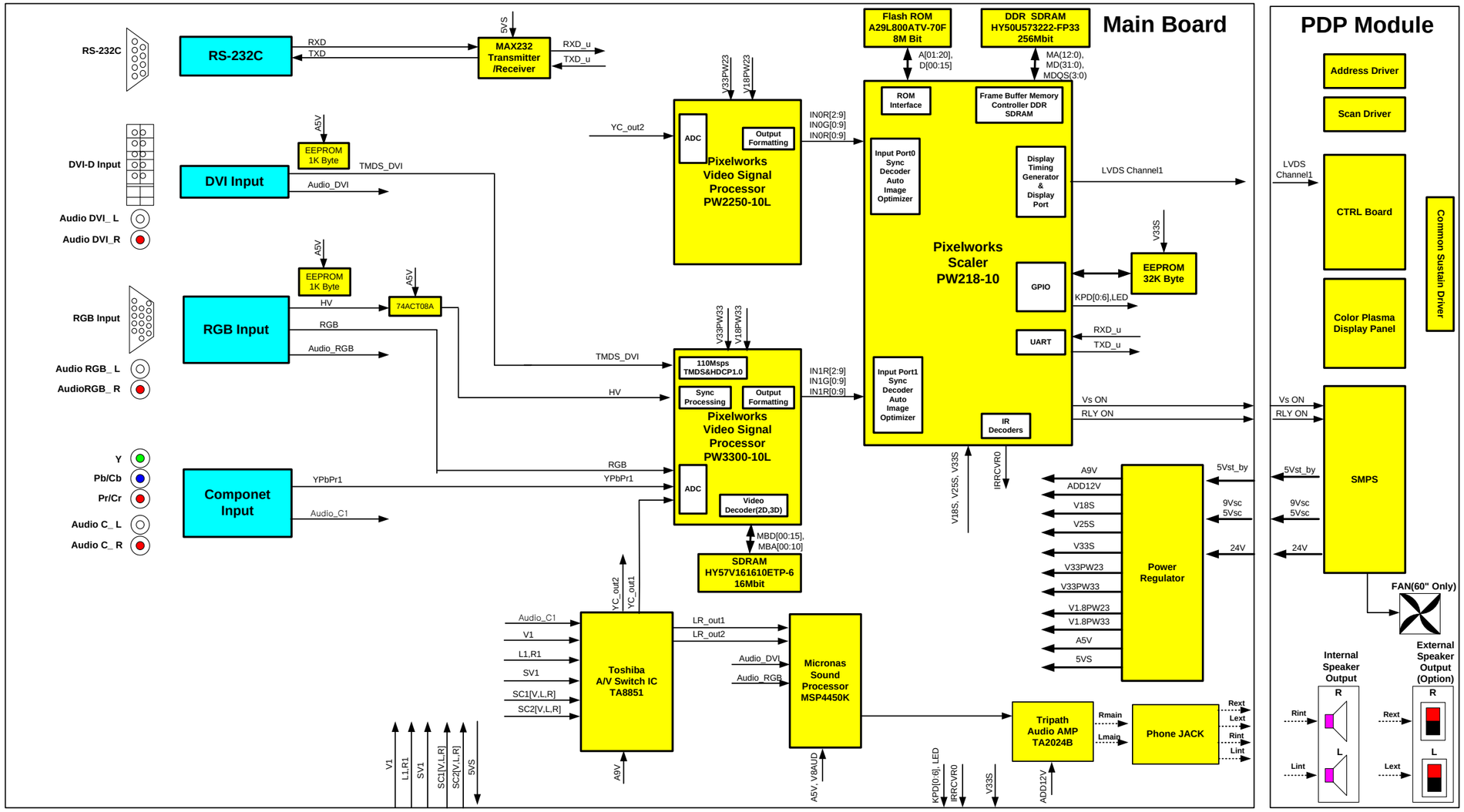
11.1 Internal Speaker	
Type	2Way 2Speaker System
Maximum Input	10W(RMS)
Impedance	8ohm
Output Sound Pressure	88dB/W/M
Frequency Response	170Hz ~ 20KHz

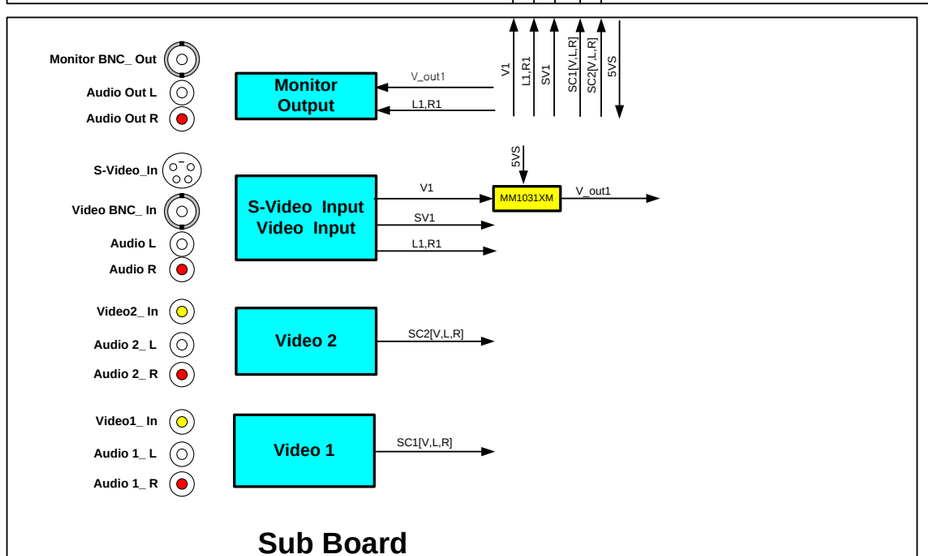
12. WARRANTY

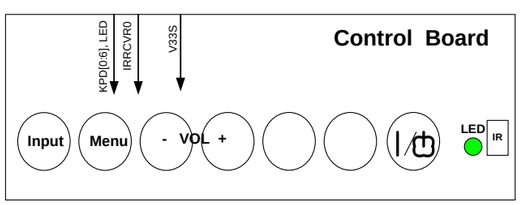
12.1 Parts and Labor	
Parts	One year after the date of shipment
Labor	One year after the date of shipment

BLOCK DIAGRAM
Model : NP-42H4B9, NP-50H4D9, NP-60H4G9

Revision 0.1 **2006.09.18**







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WoosungNextier Corp.

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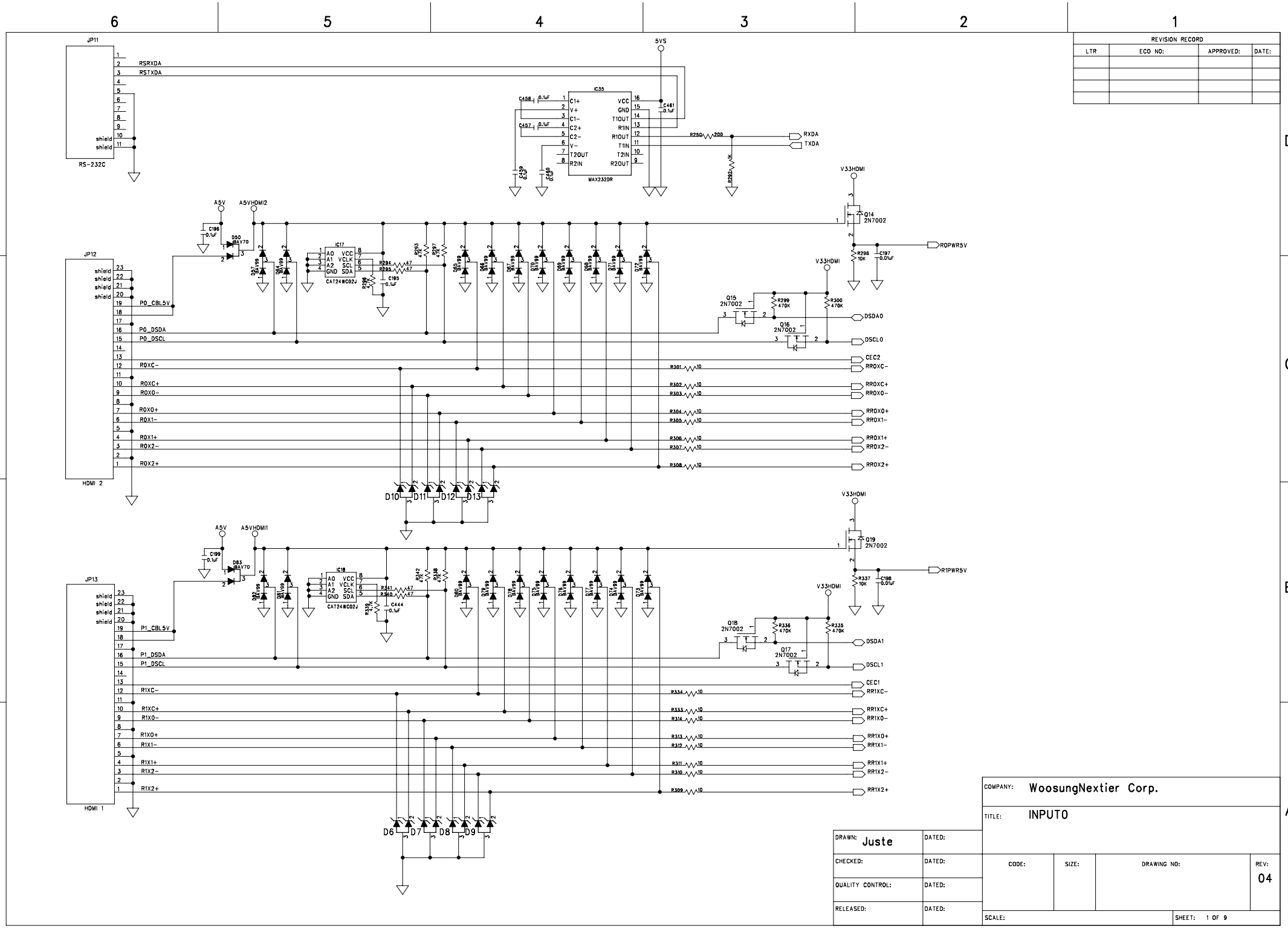
NP-42S4-Main-04(06.04.04).sch-1 - Thu Oct 12 16:22:02 2006



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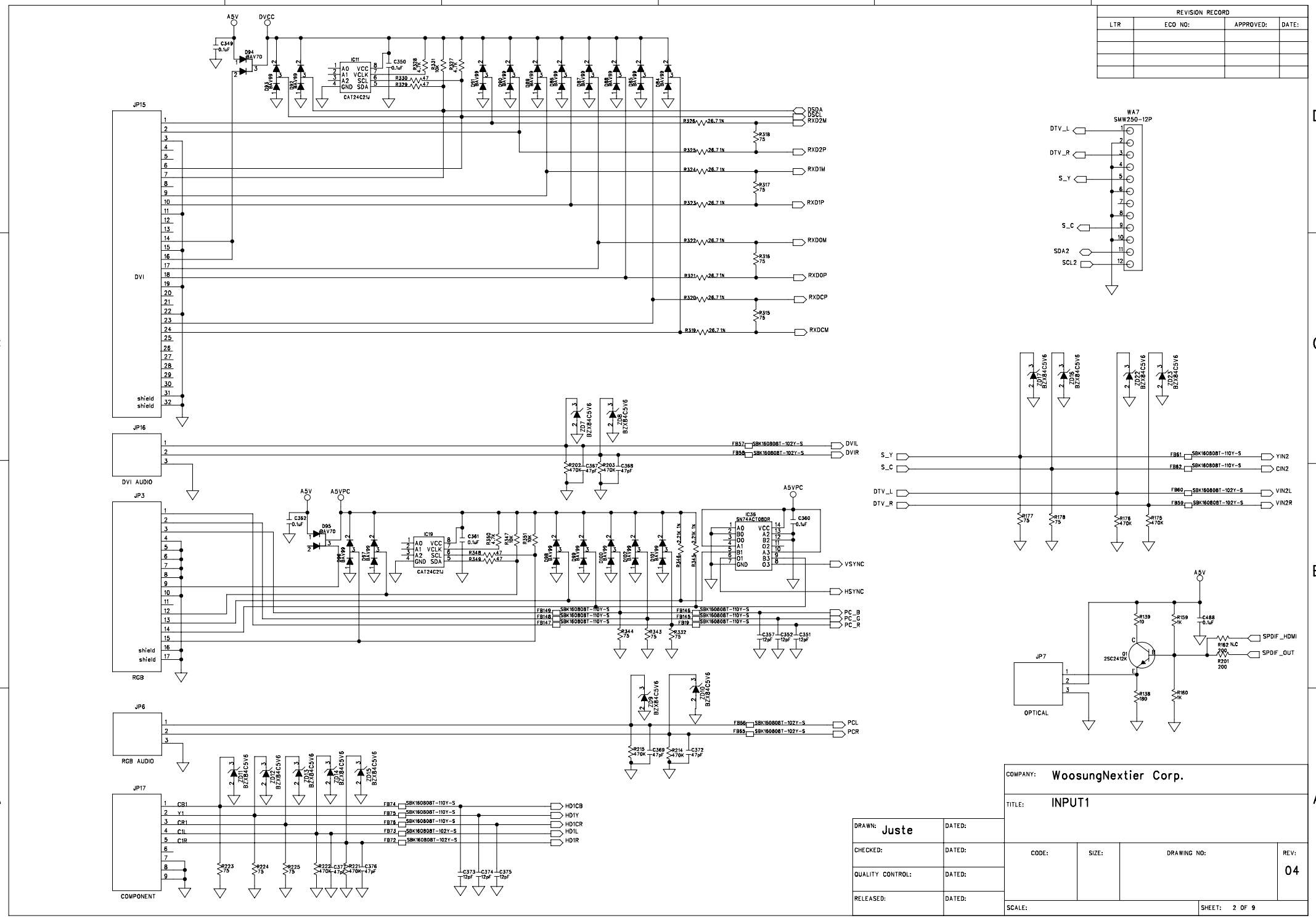

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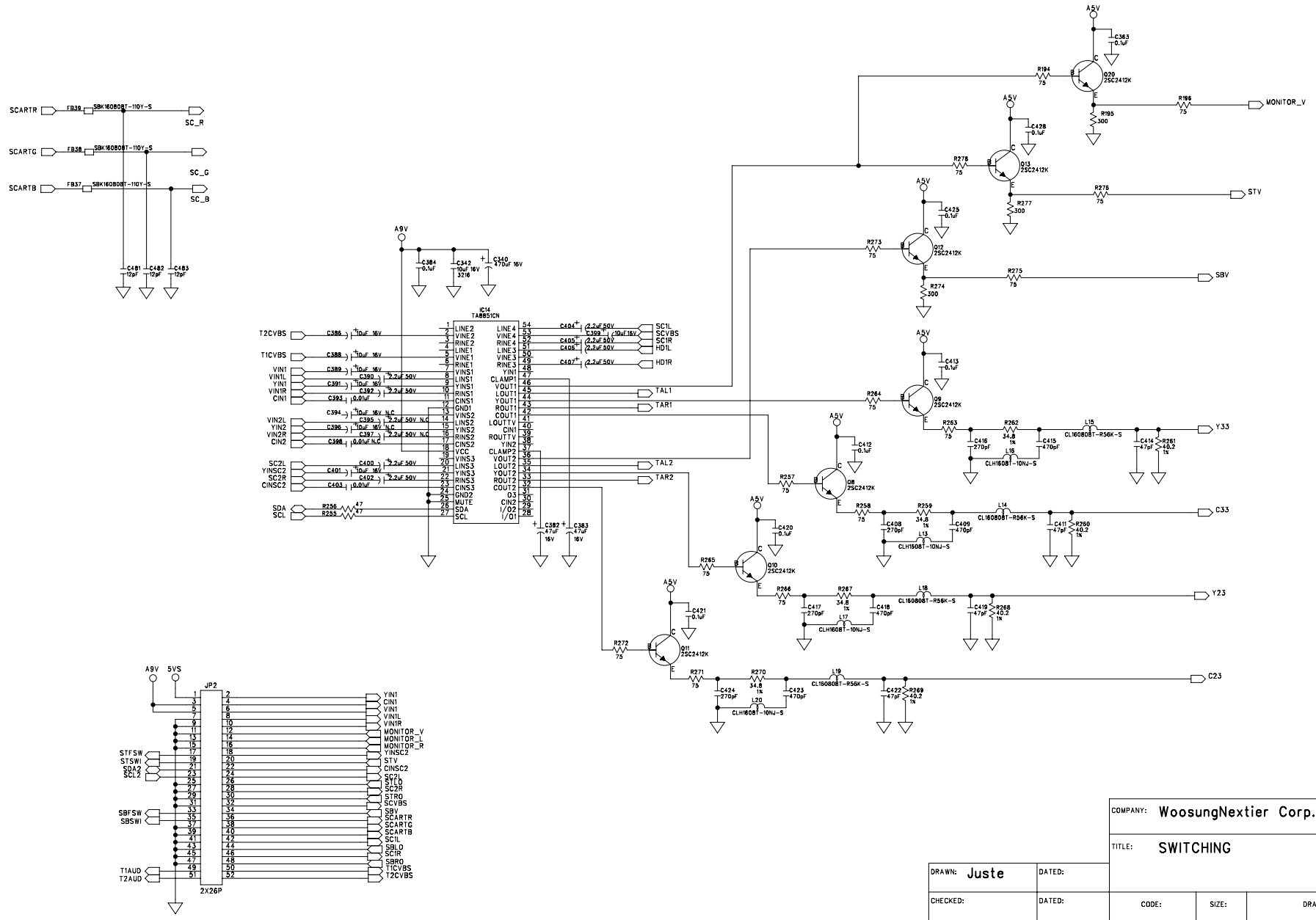

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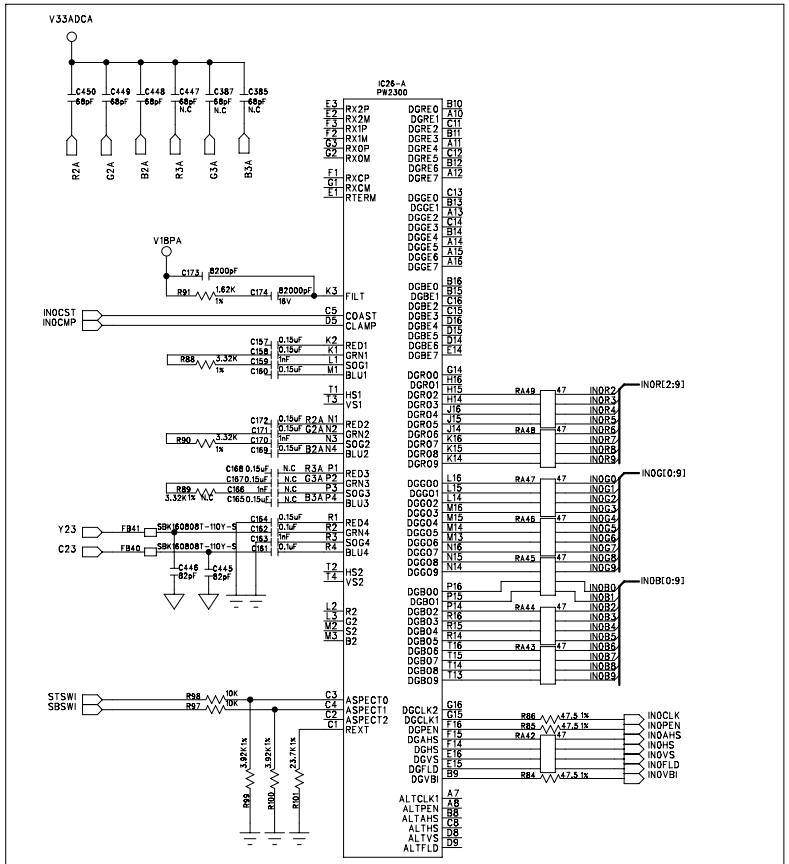

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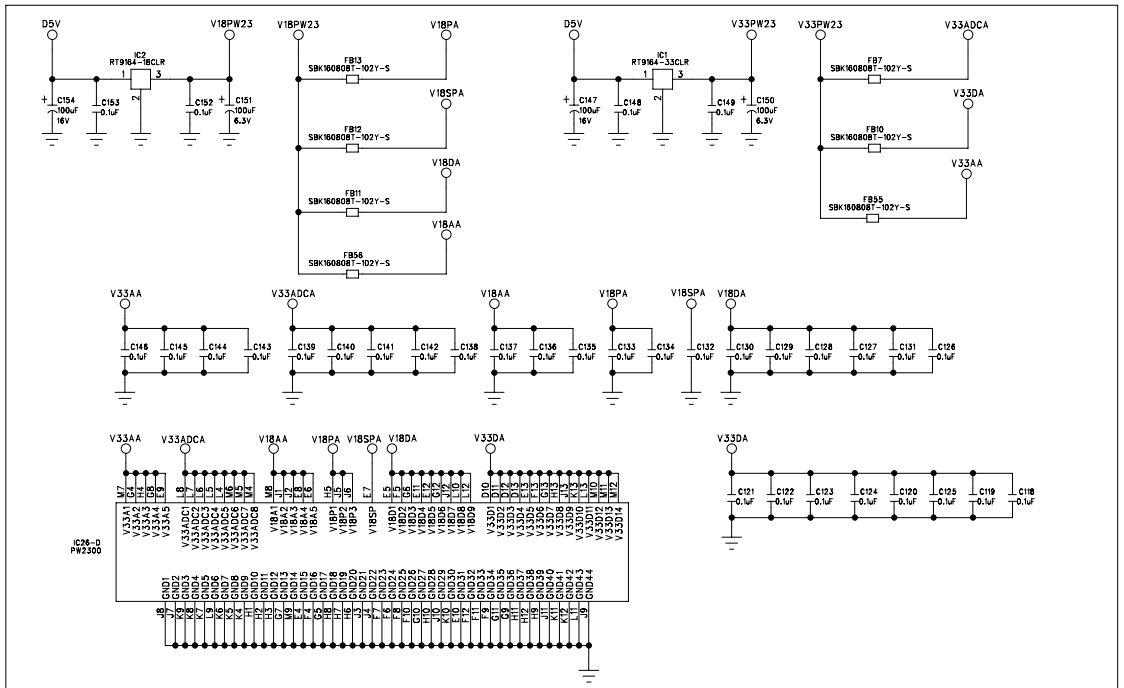

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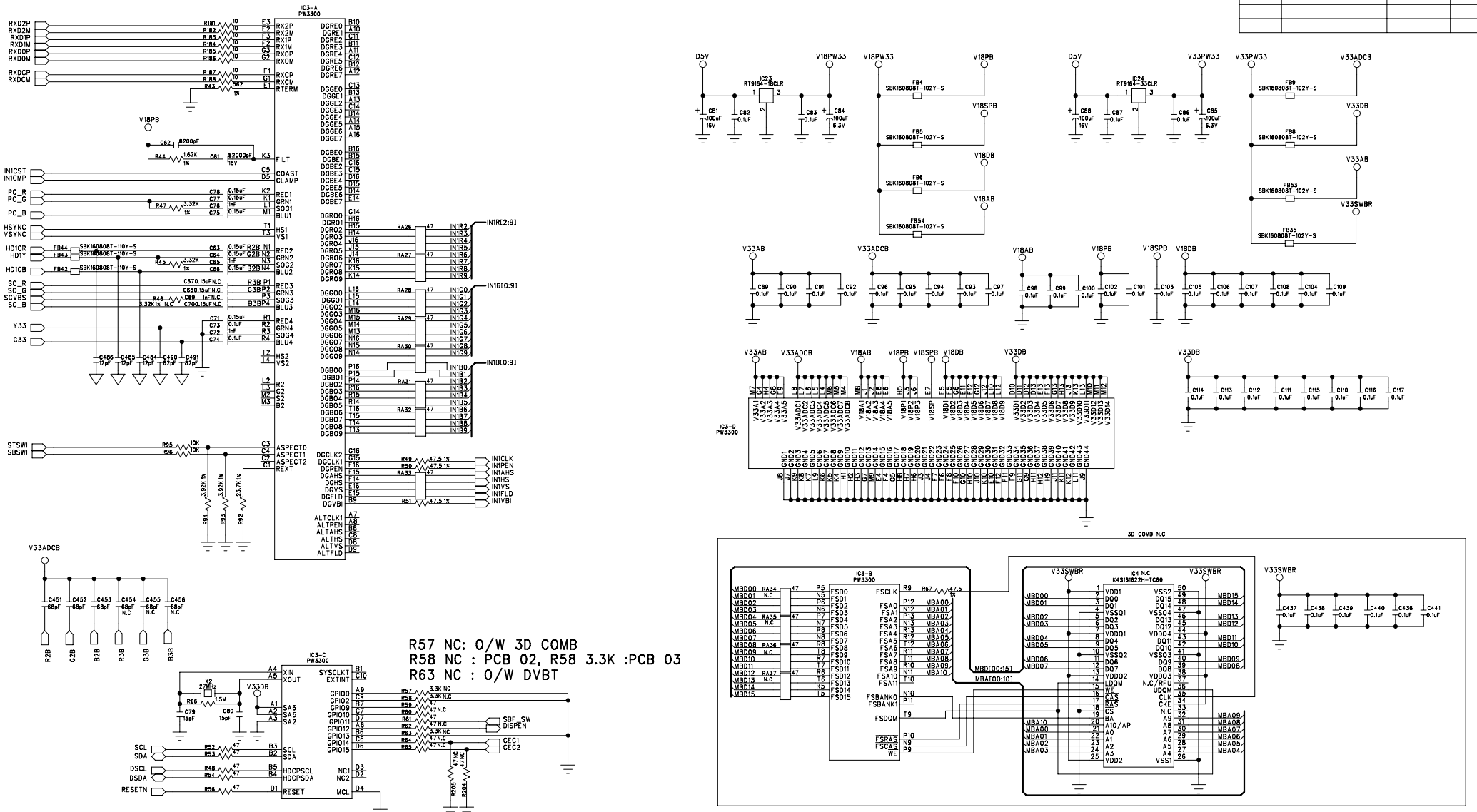

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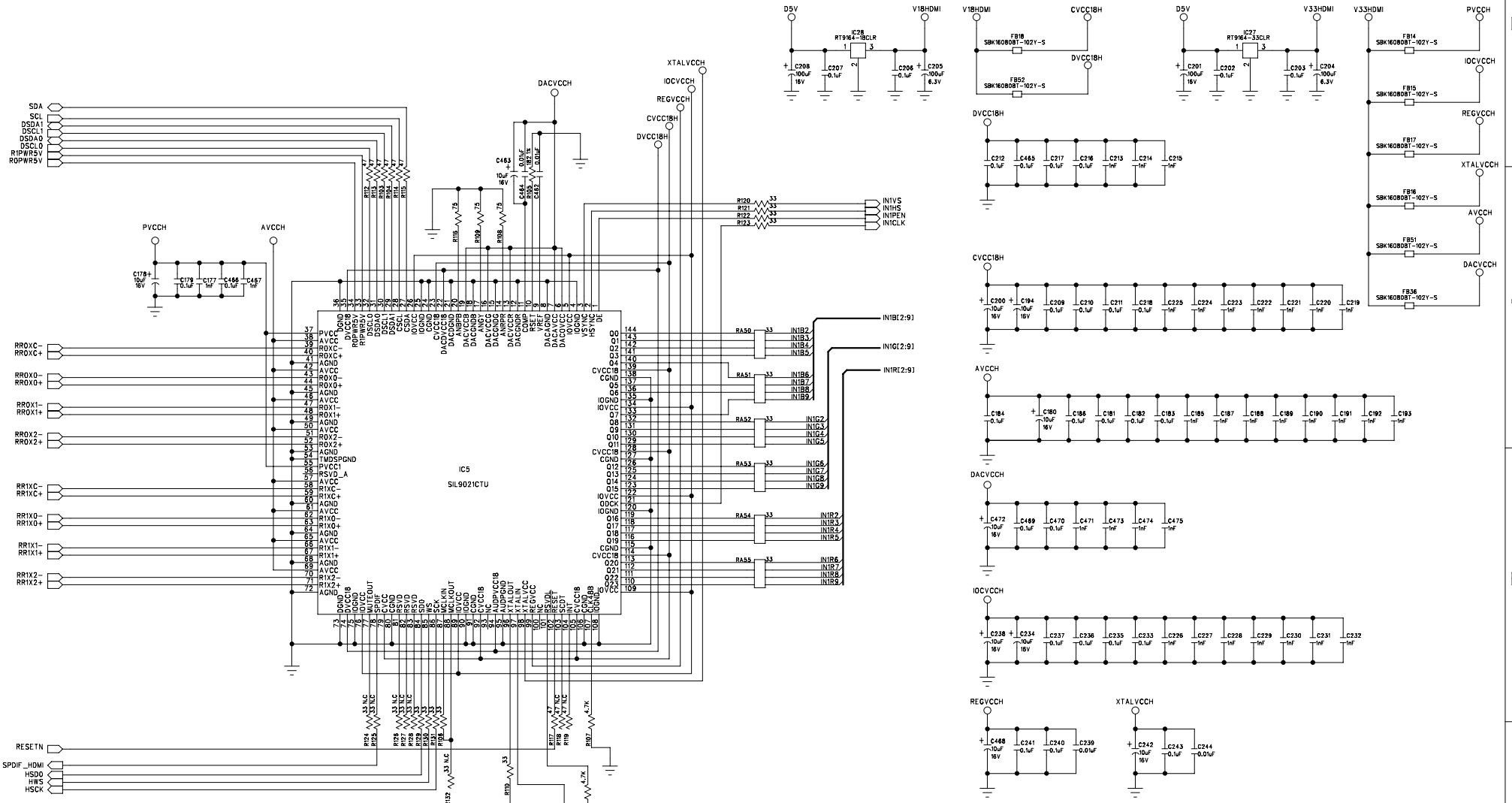

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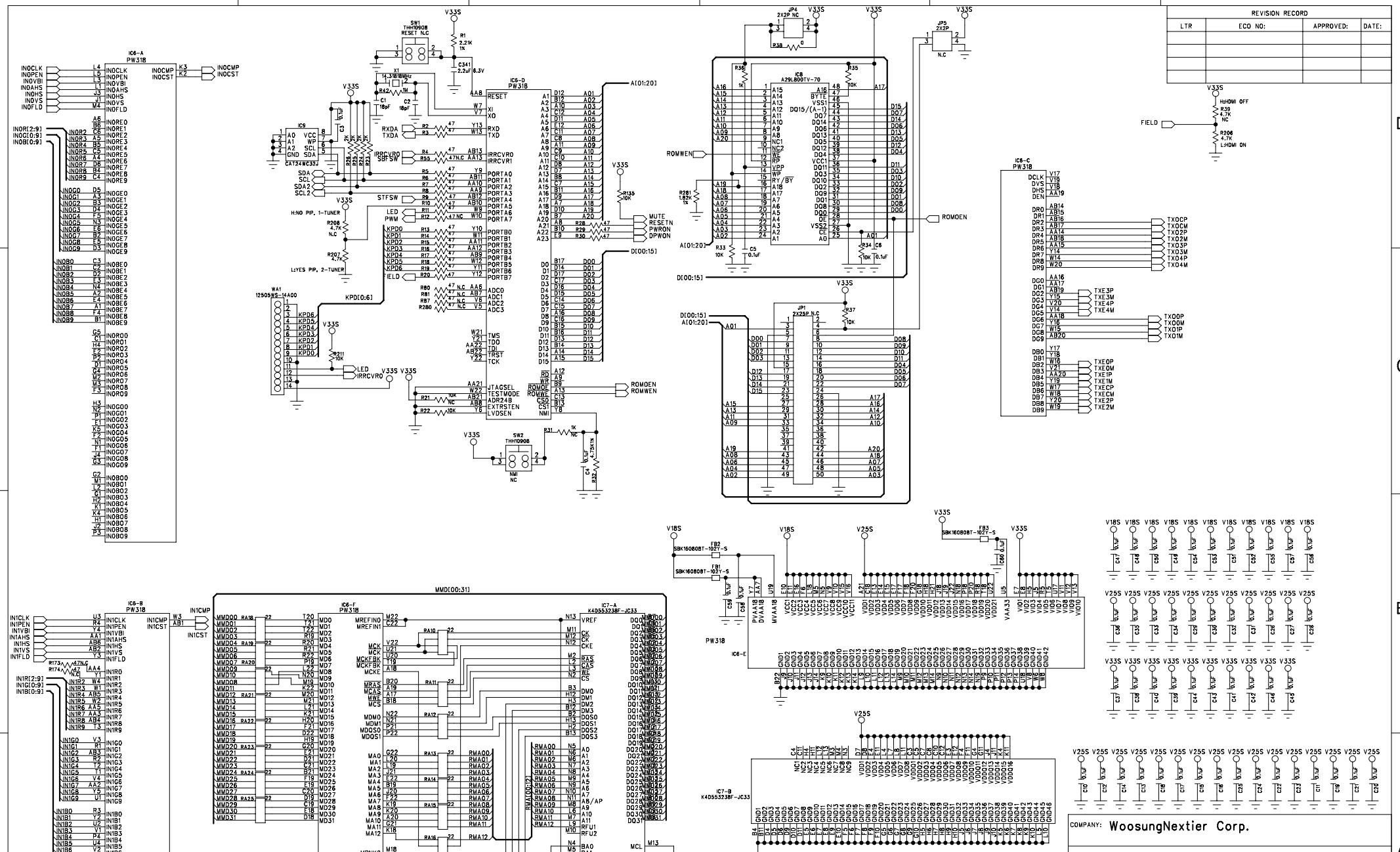

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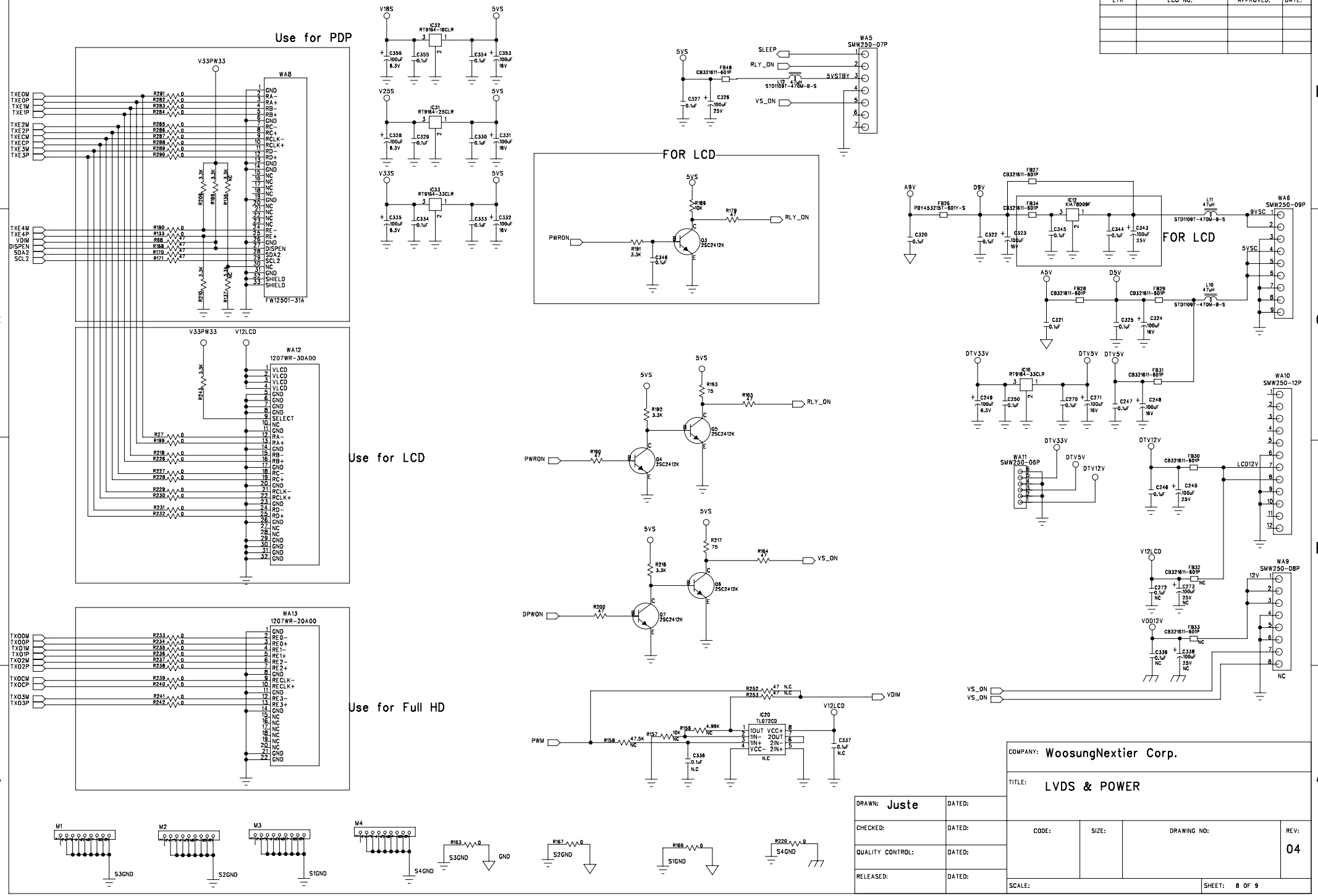

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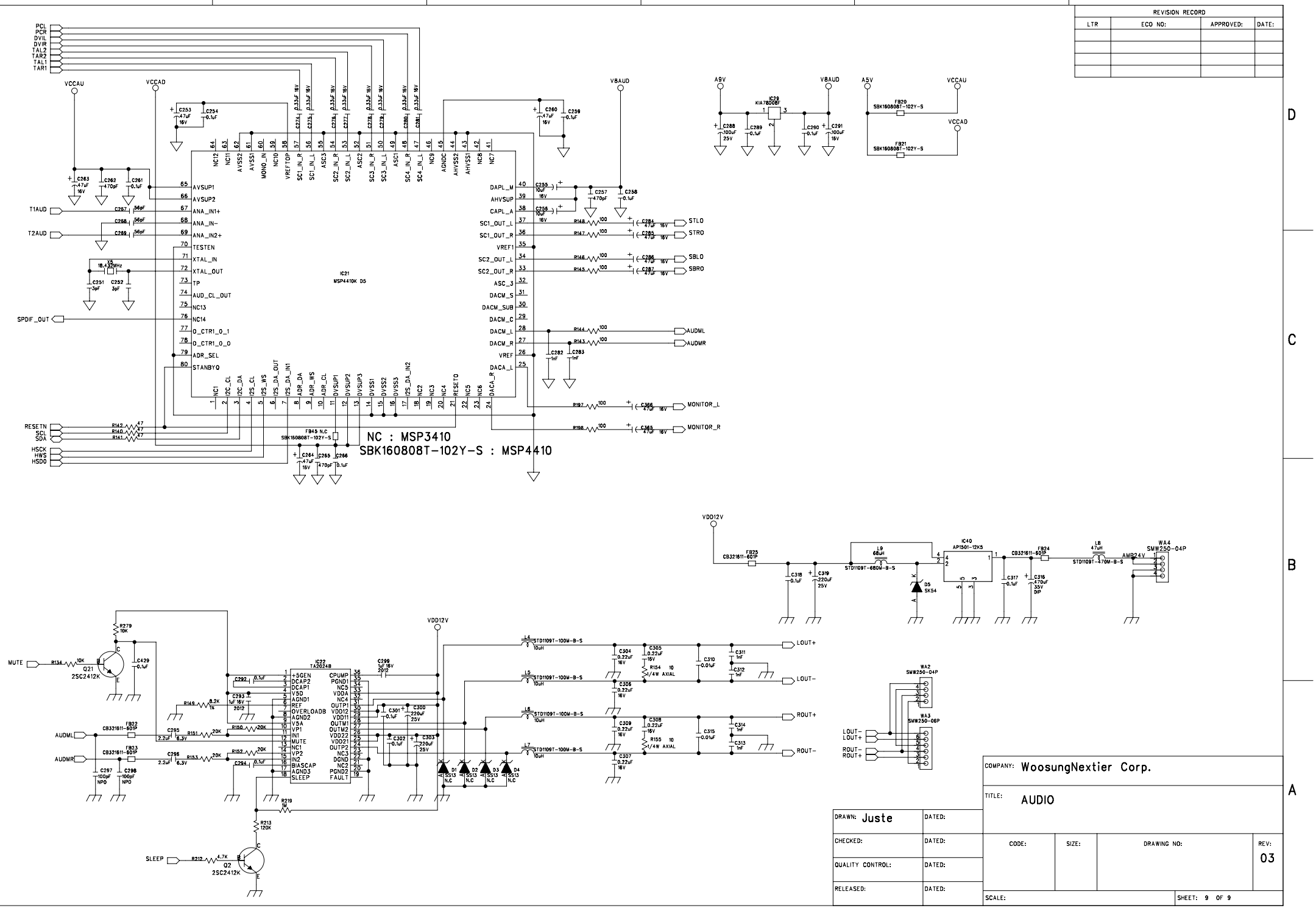

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WoosungNextier Corp.

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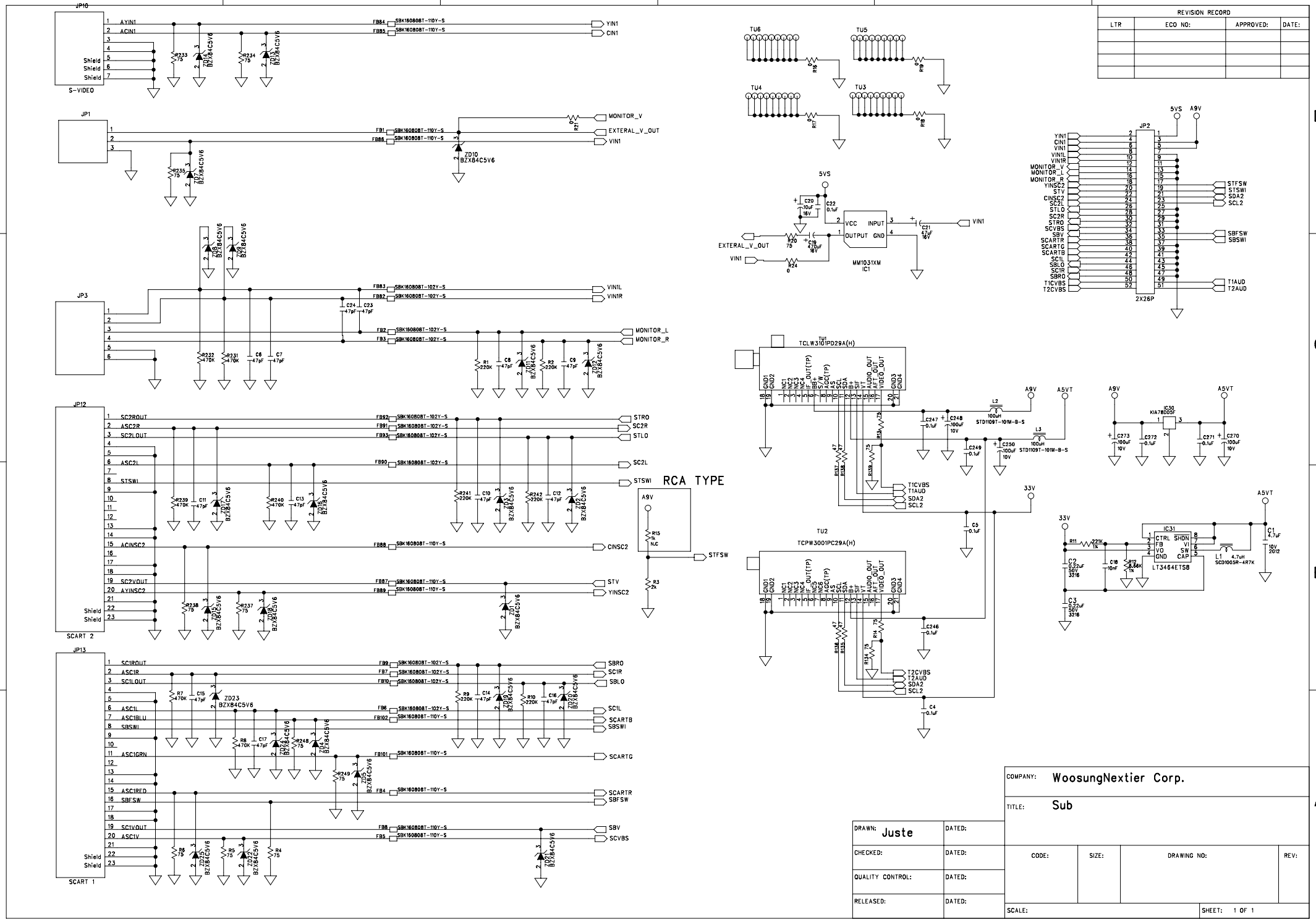
NP-42S4-SUB BNC-04(20060706).sch-1 - Thu Oct 12 16:34:29 2006



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Revision	Date	Description of Change
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REVISION RECORD			
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DRAWN: j.u. lee	DATED:
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COMPANY: Nextier Inc.

TITLE: PDP-42-Control

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NP-42S4-Control-03.sch-2 - Sat Aug 05 14:50:54 2006

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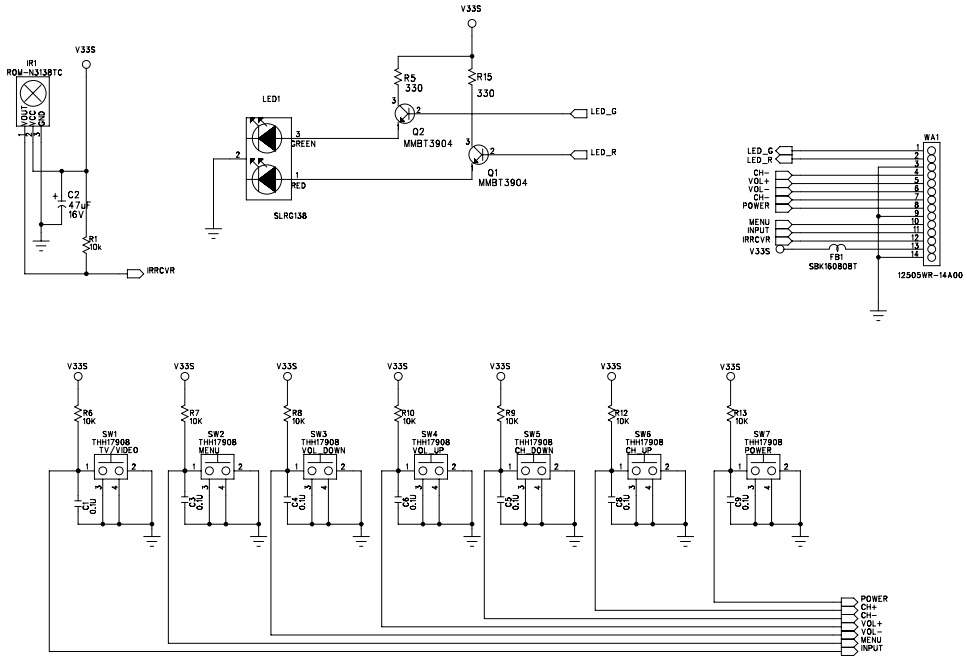

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RELEASED:	DATED:	SCALE:		SHEET: 1 OF 1	

Revision	Date	Description of Change

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

DRAWN: j.u. lee	DATED:
CHECKED:	DATED:
QUALITY CONTROL:	DATED:
RELEASED:	DATED:

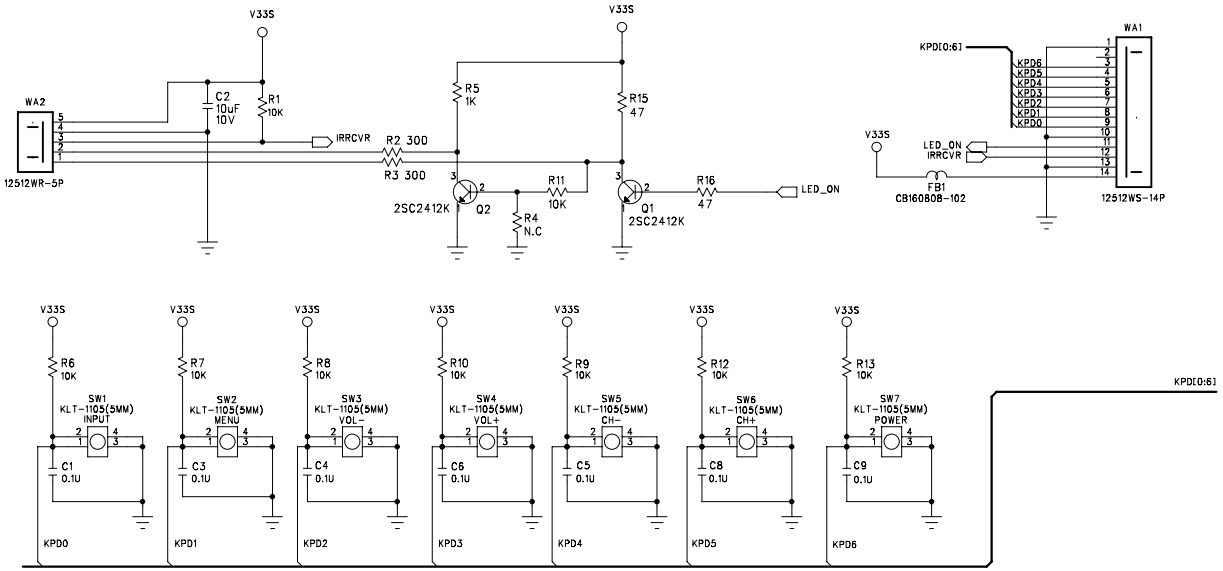
COMPANY: WoosungNextier Corp.

TITLE: NP-60H4-CONTROL-KEY-01

CODE:	SIZE:	DRAWING NO:	REV
			01

SCALE: SHEET: 1 Page

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:



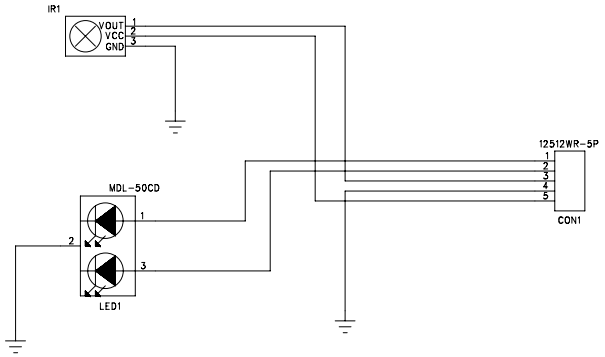
COMPANY: WoosungNextier. Corp.				
TITLE: NP-60H4-CONTROL-KEY-01				
DRAWN: j.u. lee	DATED:	CODE:	SIZE:	DRAWING NO:	REV: 01
CHECKED:	DATED:				
QUALITY CONTROL:	DATED:				
RELEASED:	DATED:	SCALE:		SHEET: 1 OF 1	

Revision	Date	Description of Change

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:

DRAWN: j.u. lee	DATED:	COMPANY: WoosungNextier Corp.	
CHECKED:	DATED:	TITLE: NP-60H4-Control_IR-01	
QUALITY CONTROL:	DATED:	CODE: / SIZE: / DRAWING NO:	REV 01
RELEASED:	DATED:	SCALE:	SHEET: 1 Page

REVISION RECORD			
LTR	ECO NO:	APPROVED:	DATE:



COMPANY: WoosungNextier. Corp.					
TITLE: NP-60H4-Control_IR-01					
DRAWN: j.u. lee	DATED:	CODE:	SIZE:	DRAWING NO:	REV: 01
CHECKED:	DATED:				
QUALITY CONTROL:	DATED:				
RELEASED:	DATED:	SCALE:		SHEET: 1 OF 1	

Image Board Inspection Methods

Revision 1.0

1. Application Limits

This instruction is applied to the inspection of PDP Products.

2. Application Model: PMCP642(NP-42H4), PMCP650(NP-50H4), PMCP660(NP-60H4)

3. The General

3.1 This test of Inspection is applied to set which is adjusted accurately according to the Inspection of PMCP642(NP-42H4), PMCP650(NP-50H4), PMCP660(NP-60H4)

3.2 This test of Inspection can be modified according to transition of production Team and R&D department.

4. The Conditional :

This inspection is tested in 20℃ standard temperature, 65% standard humidity.

5. The additional :

This inspection can be tested in normal temperature and normal humidity.(15~35℃, 45~85%)

The Registered date		( )team Opinion
Distributor	• No distributing Whole words • Cover distributor	

WoosungNextier Corp.

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  2) Speaker Output Spec.

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  2) KEY PAD / REMOTE CONTROLER Test
  3) VIDEO 1,2 Input
  4) VIDEO Input
  5) Monitor Output
  6) S-VIDEO Input
  7) COMPONENT Input
  8) RGB Input
  9) DVI Input
  10) RS232C Control TEST
  11) Image Menu
  12) Screen Menu
  13) Setup Menu
  14) Sound Menu
  15) Remote controller Function Key Test :
  Mute, Locate, SIZE, SWAP(Swap), A.SWAP(Audio Swap),
  Split Screen, S.SELECT, Input (Input choice),
  Auto(Auto default), I.SIZE(choice of screen size),
  FREEZE(Screen), Recall(Input),Sleep(Reservation of Sleep)

4. Out Going Specification
  1) Menu Mode Selection.
1. General Specification

1) In/Out Terminals Spec.

NO.	ITEM		SPECIFICATION
1	RS-232C	D-Sub 9-pin x 1	TXD/RXD(1:1)
2	DVI Input	DVI Jack x 1 (24 Pin)	Digital RGB : TMDS MAX : 720p, 1080i, 1280 x 1024 / 60 Hz (SXGA)
		RCA Jack(L+R) x 1	Audio : 0.5V[rms](Normal)/2 Channel (L+R)
3	RGB Input	D-Sub Jack x 1 (15 Pin)	Analog RGB : 0.7V[p-p](75Ω), H/CS/V:TTL(2.2 kΩ), SOG:1V[p-p](75Ω) MAX : 720p, 1080i, 1280 x 1024 / 60 Hz (SXGA)
		RCA Jack(L+R) x 1	Audio : 0.5V[rms](Normal)/2 Channel (L+R)
4	Component Input	RCA Jack x 1	Y:1V[p-p](75Ω) Pb/Cb:0.7V[p-p](75Ω), Pr/Cr:0.7V[p-p](75Ω) EDTV : 480i, 576i, 576p, 480p, 720p, 1080i
		RCA Jack(L+R) x 1	Audio : 0.5V[rms](Normal)/2 Channel (L+R)
5	Monitor Output	BNC Jack x 1	Video : 1V[p-p] (75 Ω)
		RCA Jack(L+R) x 1	Audio : 0.5V[rms](Normal)/2 Channel (L+R)
6	S-Video Input	Mini DIN Jack x 1 (4 pin)	Y: 1V[p-p] (75 Ω), C: 0.286V[p-p] (75 Ω)[NTSC] Y: 1V[p-p] (75 Ω), C: 0.300V[p-p] (75 Ω)[PAL/SECAM]
7	Video Input	BNC Jack x 1	Video : 1V[p-p] (75 Ω)[NTSC/PAL/SECAM]
		RCA Jack(L+R) x 1	Audio : 0.5V[rms](Normal)/2 Channel (L+R)
8	VIDEO 1 Input	RCA Jack x 1	Video : 1V[p-p] (75 Ω)[NTSC/PAL/SECAM] Audio : 0.5V[rms](Normal)/2 Channel (L+R)
9	VIDEO 2 Input	RCA Jack x 1	Video : 1V[p-p] (75 Ω)[NTSC/PAL/SECAM] Audio : 0.5V[rms](Normal)/2 Channel (L+R)

2) Speaker Output Spec.

(1)Internal speaker

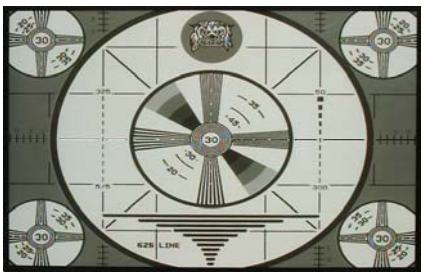
NO.	ITEM	SPECIFICATION	UNIT	REMARK
1	Freq. Response	0.17 ~ 20	KHz	Speaker Output
2	T.H.D	Max. : 5	%	400Hz 10W
3	Output	10 + 10	W	RMS
4	Impedance	8 + 8	Ω	
5	Output sound pressure	88	dB/W/M	

2. Inspection of Standardization

1) TEST PATTERN

(1) MONO SCOPE

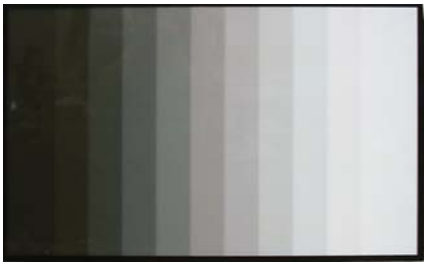
Item	Condition	Standard Value	
Resolution	MONOSCOPE Standard Mode	More than 400 (H)	
OVER SHOOT	Same as above	Can be recognized	
PRE SHOOT	〃	〃	
Frequency Sync. Range	MONOSCOPE	Horizontal	±120lines ~ ±480lines
		Vertical	- 15lines - 9lines
OVER SCAN	MONOSCOPE The half of Bright. Contrast Max.	Horizontal	Less than +10%
		Vertical	Less than +10%
ON SCREEN Remarking Position	MONOSCOPE	Should not be cut in a picture	
Vertical CENTER Adjustment	RETMA PATTERN (Clear Screen)	The central cross line of RETMA PATTERN PDP Should match the Panel of mechanical CENTER Vertical CENTER ±5mm	
Horizontal CENTER Adjustment	Same as above	The Central vertical line of RETMA PATTER Should balance in left/right. CENTER ±10mm	



<MONO SCOPE>

(2) Stair 10-Steps

- Checking the extent of saturation of left & right black & white pattern
- It Should be saturated less than black 2 step, white 2 step in left & right
- Checking unnecessary chrominance signal came up except black & white sync.
- Checking distortion and noise in a screen



< Stair 10-Steps>

(3) Color Bar

- Checking the reiterations of contacting side in each color bar
- Checking the difference of color in each color bar
- Checking the distortion and noise in screen

White	Yellow	Cyan	Green	Magenta	Red	Green	Black

<PAL, PAL-M, PAL-N>

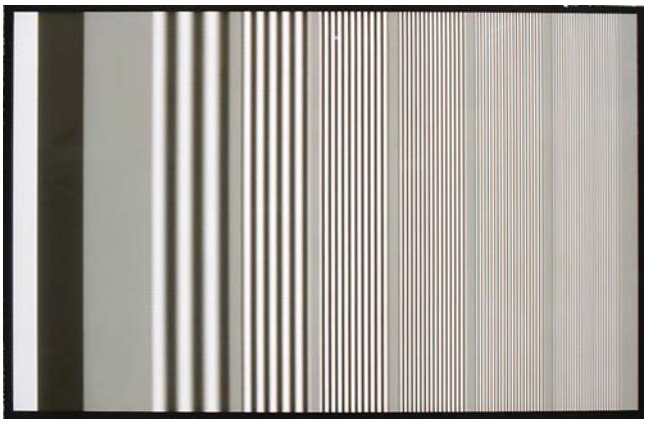
White	Yellow	Cyan	Green	Magenta	Red	blue

<NTSC,NTSC-4.43MHz>

<Full Color Bar>

(4) Multi Burst

- Checking the range of Frequency Response
- Checking the distortion and noise in screen

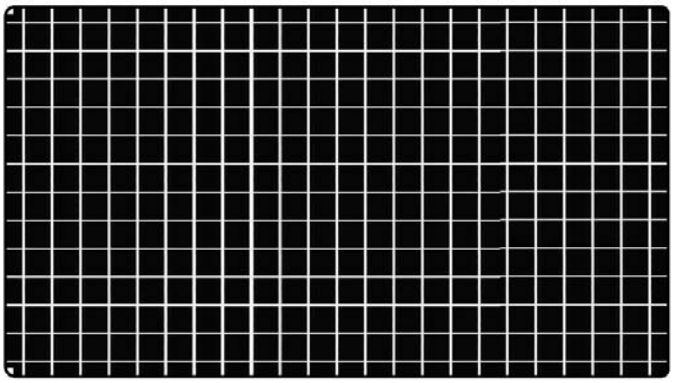


< Multi burst>

Color System	NTSC, NTSC-4.43MHz		PAL, PAL-M, PAL-N, SECAM
Multi-Burst Frequency	0.5-1.0-2.0-3.0-3.58-4.2MHz		0.5-1.0-2.0-3.0-4.0-4.8MHz
Frequency characteristic	Within 1.0dB		Within 1.0dB
Setup	0%	7.5%NTSC only	0%
White REF Signal	714.3mV	714.3mV	700.0mV
Multi-Burst pedestal	357.2mV	384.0mV	385.0mV
Black level	0mV	53.6mV	0mV

(5) Cross Pattern

- Checking something dropped out of horizontal, vertical line
- Checking the same interval between Crosshatch
- Checking the distortion and Noise

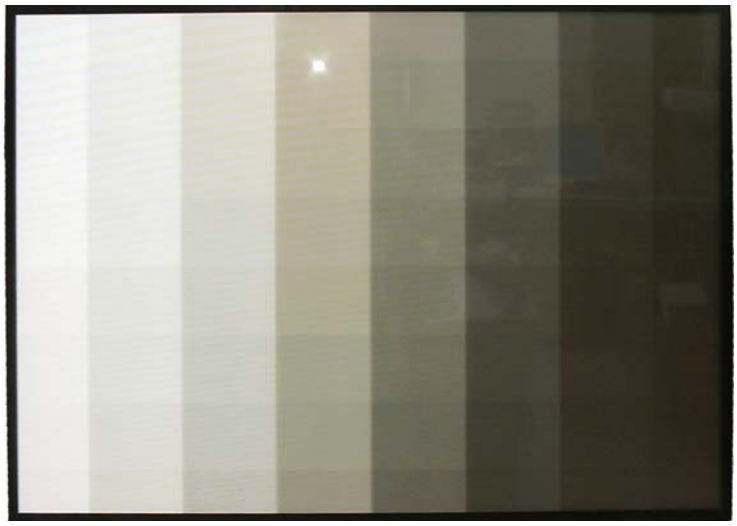


< Cross Pattern 16:9>

		Aspect ratio			
		4:3		16:9	
Line system	White Level 0%setup	525	625	525	625
	White Level 0%setup	714.3mV	700.0mV	714.3mV	700.0mV
	NTSC only	714.3mV	_____	714.3mV	_____
	Black Level 0%setup	0 mV	0 mV	0 mV	0 mV
	Black Level 0%setup NTSC only	53.6 mV	_____	53.6mV	_____
NO. of horizontal crosshatch		17		23	
No. of vertical crosshatch		13		13	
Pulse width Horizontal Vertical		 296ns±100ns 2 lines		 296ns±100ns 2 lines	
Crosshatch width Horizontal Vertical 525system 625system		 2.96us±0.3us 36 lines 44 lines		 2.22us±0.3us 36 lines 44 lines	

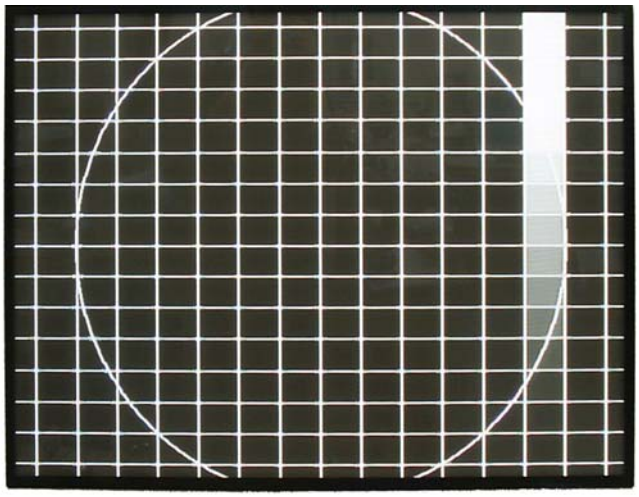
(6) 64-gradation block gray

- Checking the saturation of between splinter
- Seeing the difference of Brightness/Contrast
- Checking the distortion and noise in screen



<64-Gradation Block Gray>

(7) Crosshatch & circle & gray

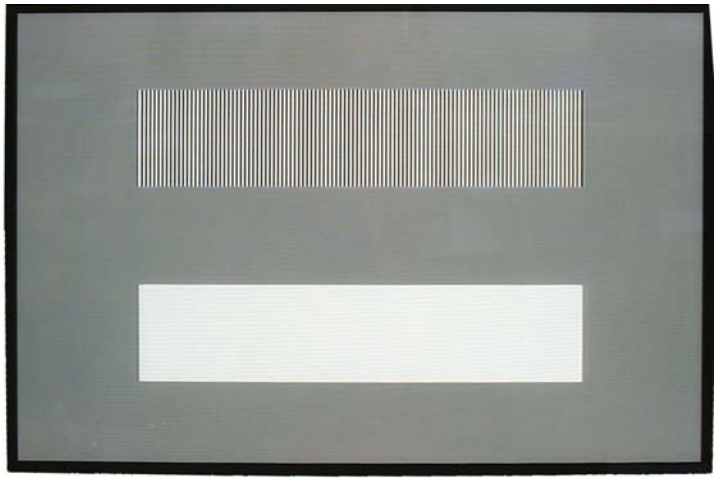


<Crosshatch & Circle & Gray>

- Checking that it is something dropped out of in horizontal, vertical line of crosshatch
- Checking that the interval between crosshatch line is equal
- Checking that printing-out of exact circle shape is right
- Checking brightness, contrast through gray pattern
- Checking that the distortion and noise is in screen

(8) Crosstalk

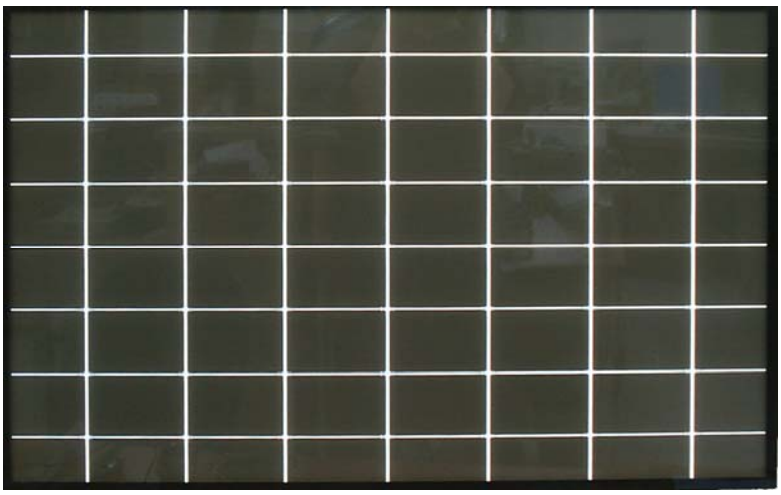
- Checking that Burst line is clear
- Checking that there is no distortion and noise



< Crosstalk>

(9) 8-black Crosshatch

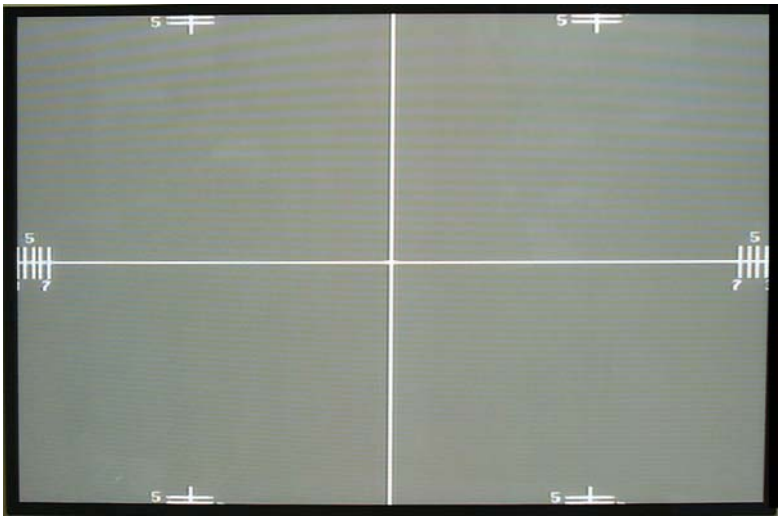
- Checking that it is something dropped out of in horizontal, vertical line of crosshatch
- Checking that the interval between line is equal
- Checking that there is no distortion and noise



<8-black Crosshatch>

(10) Display Position

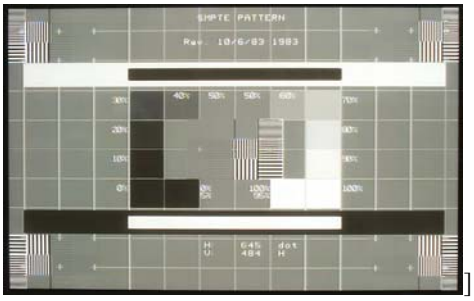
- Checking the balance of left & right & top & bottom in a base of vertical line of center.
- Checking that the horizontal line of center should match the mechanical center of PDP Panel.
- Checking that there is no distortion and noise



< Display position>

(11) SMPTE RP-133

- Checking that it is something dropped out of in horizontal, vertical line of crosshatch
- Checking that there is no problem of handling high frequency Sync.
- Checking Multi-bust Signal Frequency
- Checking that there is no distortion and noise



< SMPTE RP-133>

(12) 256Gray+RGBW Color Bar

- Checking the reiterations of contacting side In each color bar
- Checking that the printing-out of color is right
- Checking the range if Saturation
- Checking that there is no distortion and noise

<256gray+RGBW color bar>

※(1)~(5) Pattern is the standard of ShibaSoku (TG-19CC) Signal and (1) ~(5) Pattern is applied to VIDEO, S-VIDEO and VIDEO1,2 Input.

※(6)~(12) Pattern is the standard of ASTRODESIGN(VG-848) Signal and (6) ~ (12) Pattern is applied to RGB, DVI, Component Input.

2) Speaker Output

Item	Condition of Inspection	Standard
Signal/Noise Ratio	Sound : 1KHz, more than 30% MODULATION Picture : Black 50mW	More than 37dB
Signal/Buzz Ratio	Sound : 1KHz, more than 30% MODULATION Picture : COLOR BAR 50mW	More than 35dB
Max. Audio output	Sound : 1KHz, 100% MODULATION Volume : Max.	More than 9 W 8Ω Resistance

3) Input/Output

Input	Condition	standard
VIDEO 1,2 Input	Video	No any distortion & noise in Screen
	Audio	No any distortion & noise in Audio
Video Input	Video	No any distortion & noise in Screen
	Audio	No any distortion & noise in Audio
S-Video Input	Y,C	No any distortion & noise in Screen
	Audio	No any distortion & noise in Audio
Monitor Output	Video	No any distortion & noise in Screen
	Audio (L + R)	No any distortion & noise in Audio
Component Input	Y, Pb(Cb), Pr(Cr)	No any distortion & noise in Screen
	Audio	No any distortion & noise in Audio
R,G,B Input	Analog RGB	No any distortion & noise in Screen
	Audio	No any distortion & noise in Audio
DVI Input	Digital RGB	No any distortion & noise in Screen
	Audio	No any distortion & noise in Audio

※ Video Signal Cross-Talk Level

- Should not be hindered by other signal input when signal inputs all inputs of signal

3. Test of function of electric circuit

1) LED On/Off Test

(1) Checking that the stand-by signal -red- is lighting on

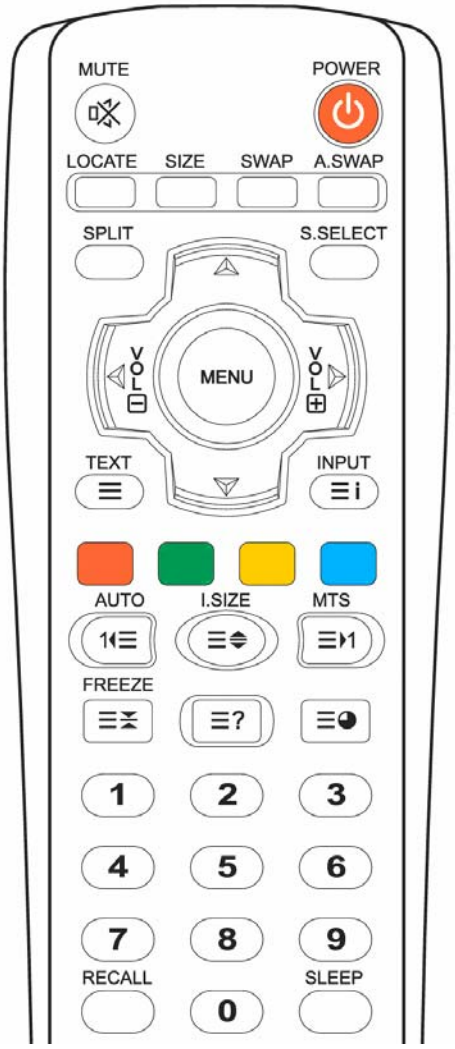
(2) Checking that working condition(power on) -green- is lighting on

(3) Checking that no signal condition LED is blinking

2) KEY PAD / REMOTE CONTROLER Test

(1) Push MENU key of front or remote control and check adjustment like below Box.

MENU		
Move[-VOL+]	Select[▼ ▲]	EXIT[Menu]



3) VIDEO 1,2 Input

(1) Please connect the signal of VIDEO Input to VIDEO Input as RCA Cable

(2) Please power on by pushing [POWER]key of front or remote controller

(3) Please select VEDEO Input by using [-VOL+] and [▼ ▲]key after pushing [INPUT]key

INPUT
VIDEO1
VIDEO2
.

(4) Press the TEXT button

(The Closed Caption Menu is displayed)

(5) Press the TEXT button to select option

(OFF,CC1,CC2,CC3,CC4,TEXT1,TEXT2,TEXT3,TEXT4)

(6) Please check CC1 is working well, connecting Closed Caption signal of ShibaSoku(TG-19CC) or VCR(SV-7000W) : This function works only in 'Normal split mode'

(7) Please check that the video signal in each mode is working well

(8) Please check that Sound is working well by pushing [-VOL+]key of front or remote controller

4) VIDEO Input

(1) Please connect the signal of VIDEO Input to VIDEO Input as BNC Cable

(2) Please power on by pushing [POWER]key of front or remote controller

(3) Please select VEDEO Input by using [-VOL+] and [▼ ▲]key after pushing [INPUT]key

INPUT
VIDEO1
VIDEO2
VIDEO
.

(4) Press the TEXT button

(The Closed Caption Menu is displayed)

(5) Press the TEXT button to select option

(OFF,CC1,CC2,CC3,CC4,TEXT1,TEXT2,TEXT3,TEXT4)

(6) Please check CC1 is working well, connecting Closed Caption signal of ShibaSoku(TG-19CC)or VCR(SV-7000W) : This function works only in 'Normal split mode'

(7) Please check that the video signal in each mode is working well

(8) Please check that Sound is working well by pushing [-VOL+]key of front or remote controller

5) Monitor Output

(1) Please connect VIDEO Input signal to VIDEO Input as BNC Cable

(2) Please connect the output of test installation to Monitor output as BNC Cable

(3) After connecting 8 Ω dummy resistance to speaker output in left, right please connect Multi-Meter to in each edge of dummy resistance

(4) Please power on by pushing [POWER]key of front or remote controller

(5) Please select VIDEO through [-VOL+] and [▼ ▲]key after pushing [INPUT]key

INPUT
VIDEO1
VIDEO2
VIDEO
.

(6) Please check that All in-coming video signal is working well

(7) Please check that Video signal is appearing in Monitor Output

(8) Please adjust Audio sound with max through [-VOL+]key of owner's remote controller

(9) Please check that the maximum of incoming Audio signal is more than 8.8V[rms]

(10) Please check 8 Ω in left & right of speaker output and Multi-Meter

(11) Please check that audio sound is good by pushing [-VOL+]key

(12) Please check that Video signal(V) and Audio signal(R+L) is having right output

(13) Please power OFF by pushing [POWER]key of front or remote controller

(14) Please check that Video signal(V) and Audio signal(R+L) is having right output

6) S-VIDEO Input

(1) Please connect S-VIDEO terminal as S-Video Cable to S-VIDEO output

(2) Please connect Audio input terminal as RCA Audio Cable to Audio output

(3) Please power on by pushing [POWER]key of front or remote controller

(4) Please select S-VIDEO by pushing [-VOL+] and [▼ ▲]key after [INPUT]key

INPUT
.
S-VIDEO
.

(5) Press the TEXT button

(The Closed Caption Menu is displayed)

(6) Press the TEXT button to select option

(OFF, CC1,CC2,CC3,CC4,TEXT1,TEXT2,TEXT3,TEXT4)

(7) Please check CC1 is working well, connecting Closed Caption signal of ShibaSoku(TG-19CC)

or VCR(SV-7000W) : This function works only in 'Normal split mode'

(8) Please check all video signal in each mode is having good input in screen

(9) Please check the sound is voiced well by pushing [-VOL+]key

7) COMPONENT Input

(1) Please connect Video & Audio signal to COMPONENT terminal as COMPONENT Cable

(2) Please power on by pushing [POWER]key of front or remote controller

(3) Please select COMPONENT by using [-VOL+] and [▼ ▲]key after [INPUT]key

INPUT

.

COMPONENT

.

(4) Please check video signal is appearing in screen well

(5) Please check that Audio sound is coming out well by pushing [-VOL+]key

(Please check signal of Component Mode Table)

Mode	Resolution	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	Pixel Clock Frequency (MHz)	Remark
EDTV 480i	720 x 480	15.730	29.970	13.5000	Support
EDTV 576i	720 x 576	15.630	25.000	13.5000	Support
SDTV 480p	720 x 480	31.470	59.940	27.000	Support
SDTV 576p	720 x 576	31.250	50.000	27.000	Support
HDTV 720p	1280 x 720	45.000	60.000	74.250	Support
		44.960	59.940	74.180	Support
		37.500	50.000	74.250	Support
HDTV 1080i	1920 x 1080	33.750	30.000	74.250	Support
		33.720	29.970	74.180	Support
		31.250	25.000	74.250	Support
		28.125	25.000	74.250	Support

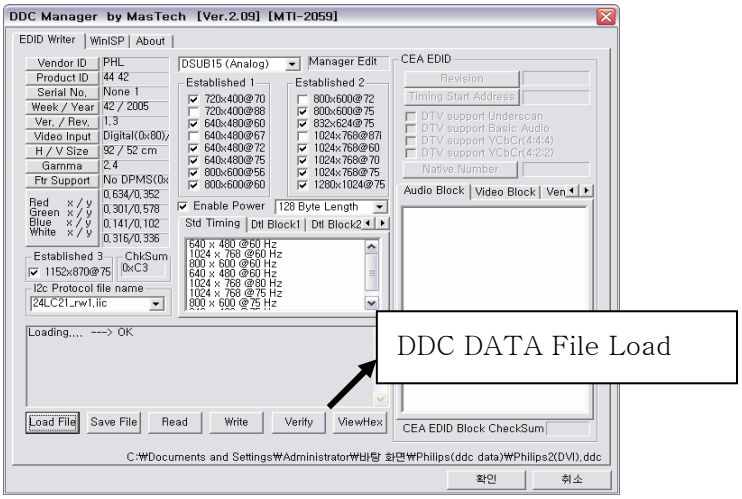
<Component Mode Table >

8) RGB Input(DDC DATA WRITE is optional per Buyer)

(1) Please connect the Parallel Port of DDC WRITER and the Parallel Port of PC to Cable.

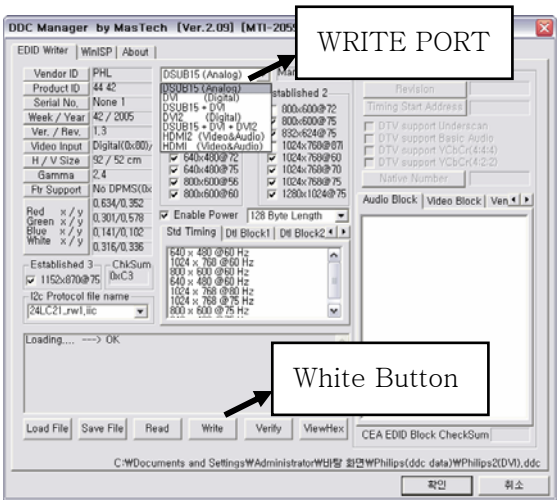
(2) Please connect the ANALOG Port of DDC WRITER and the RGB Port of MAIN BOARD to RGB Cable.

(3) Please send for RGB DDC FILE by pushing LOAD FILE after excelling the DDC WRITE PROGRAM of PC.



(4) Write Please choose Write Port(DSUB 15(Analog))

(5) Please change DDC DATA to Write format by pushing "Write" button.



(6) Please check DDC DATA by reading.

(7) Connect the out-coming of RGB Video signal to RGB input as 15 Pin D-Sub

(8) Connect the out-coming of RGB Audio signal to RGB Audio input as RCA Audio Cable

(9) Please power on by pushing front KEY or "POWER" of REMOCON

(10) Please select "RGB" terminal by using [-VOL+],[▼ ▲]key after Input key of REMOCON

```
              INPUT
VIDEO 1
  .
RGB
```

(11) Please check that RGB Video signal is appearing in screen well after switching to RGB Mode (Check the signal of DVI/RGB Mode Table)

(12) Please connect the RGB PORT of PC and the RGB PORT of MAIN BOARD to 15Pin D-SUB CABLE.

(13) Please check that the function of frame lock is normal by using the SCROLL KEY in KEY BOARD and by controlling moving speed after excelling BLIT program of PC.

(The range of Frequency o Frame lock is 57Hz < Vsync < 61Hz)

* Frame lock working condition : Screen should not disappear when the screen be movable.

(14) Please check the Sound is good by pushing CONTROL KEY or "-VOL+" KEY of REMOCON

Mode	Resolution	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	Pixel Clock Frequency (MHz)	Remark
VGA	640 x 350	31.460	70.000	25.170	Support
	640 x 400	37.861	85.000	31.500	Support
	720 x 400	31.469	70.000	28.320	Support
	640 x 480	31.460	50.000	25.170	Support
		31.500	60.000	25.175	Support
		37.700	72.000	31.500	Support
		37.500	75.000	31.500	Support
		43.300	85.000	36.000	Support
SVGA	800 x 600	35.100	56.000	36.000	Support
		37.900	60.000	40.000	Support
		48.100	72.000	50.000	Support
		46.900	75.000	49.500	Support
		53.700	85.000	56.250	Support
	832 x 624	49.720	75.000	57.280	Support

< DVI/RGB Mode Table(1/2) >

Mode	Resolution	Horizontal Frequency (kHz)	Vertical Frequency (Hz)	Pixel Clock Frequency (MHz)	Remark
XGA	1024 x 768	48.400	60.000	65.000	Support
		56.500	70.000	75.000	Support
		60.000	75.000	78.750	Support
		64.000	80.000	85.500	Support
		68.300	85.000	94.500	Support
	1152 x 870	68.680	75.000	100.000	Support
SXGA	1280 x 1024	64.000	60.000	108.000	Support
WXGA	1366 x 768	50.000	60.000	84.400	Support
SDTV 480p	720 x 480	31.470	59.940	27.000	Support
SDTV 575p	720 x 576	31.250	50.000	27.000	Support
HDTV 720p	1280 x 720	45.000	60.000	74.250	Support
		44.960	59.940	74.180	Support
		37.500	50.000	74.250	Support
HDTV 1080i	1920 x 1080	33.750	30.000	74.250	Support
		33.720	29.970	74.180	Support
		31.250	25.000	74.250	Support
		28.125	25.000	74.250	Support

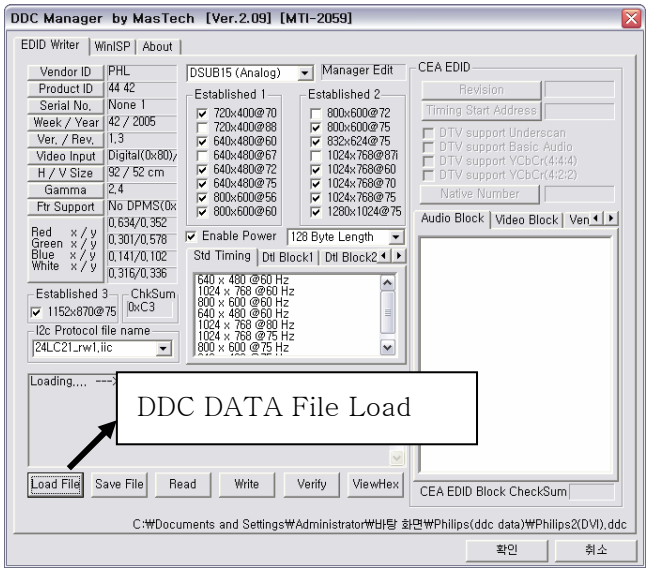
< DVI/RGB Mode Table(2/2) >

9) DVI Input

(1) Please connect the Parallel Port of DDC WRITER and the Parallel Port of PC to Cable.

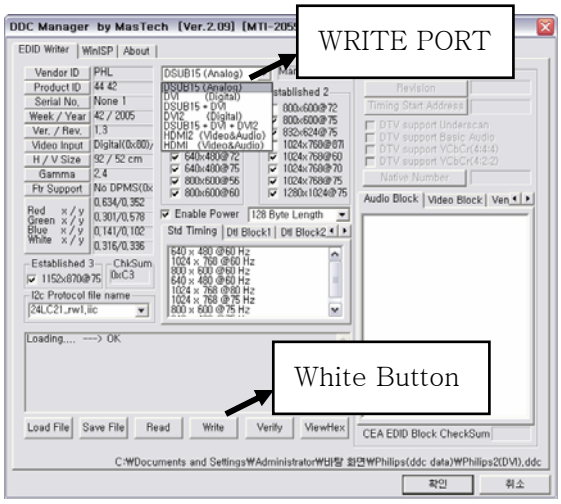
(2) Please connect the DVI Port1 of DDC WRITER and the DVI Port of MAIN BOARD to DVI Cable.

(3) Please send for DVI DDC FILE by pushing LOAD FILE after excelling the DDC WRITE PROGRAM of PC.



(4) Please choose Write Port(DVI(Digital)) or DVI2(Digital))

(5) Please change DDC DATA to Write format by pushing "Write" button.



(6) Please check DDC DATA by reading.

(7) Connect ASTRO VG-848H of DVI output to DVI Video input

(8) Connect Audio out- coming of ASTRO VG-848H of DVI to DVI audio input

(9) Please power on PDP TV by pushing front key or "POWER" KEY of REMOCON

(10)Please select DVI Input by using [-VOL+], [▼ ▲]key after pushing front KEY or INPUT of REMOCON

INPUT

.

RGB

DVI

(11) Check DVI video signal is appearing well in screen after moving to DVI Input (Check the signal of DVI/RGB Mode Table)

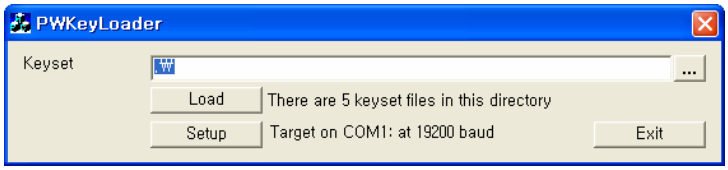
(12) Please connect the DVI PORT of PC and the DVI PORT of MAIN BOARD to DVI CABLE.

(13) Please check that the function of frame lock is normal by using the SCROLL KEY in KEY BOARD and by controlling moving speed after excelling BLIT program of PC.
(The range of Frequency o Frame lock is 57Hz < Vsync < 61Hz)
* Frame lock working condition : Screen should not disappear when the screen be movable.

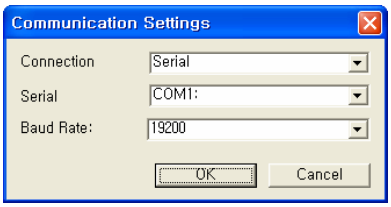
(14) Check the sound is good after pushing the front key or "-VOL+" KEY of REMOCON

(15) Please connect the Serial Port of PC and the RS232C Port of Main Board to 9 Pin D-SUB Cable

(16) Please execute the PWKeyLoader program



(17) Please click Setup tap and check the configuration of PWKeyLoader



(18) Please click Load. Then the HDCP key would be written

(19) Please connect the DVI output(with HDCP) of DVD Player and DVI input of Main Board to DVI Cable

(20) Please check that video signal of HDCP is appearing rightly in screen

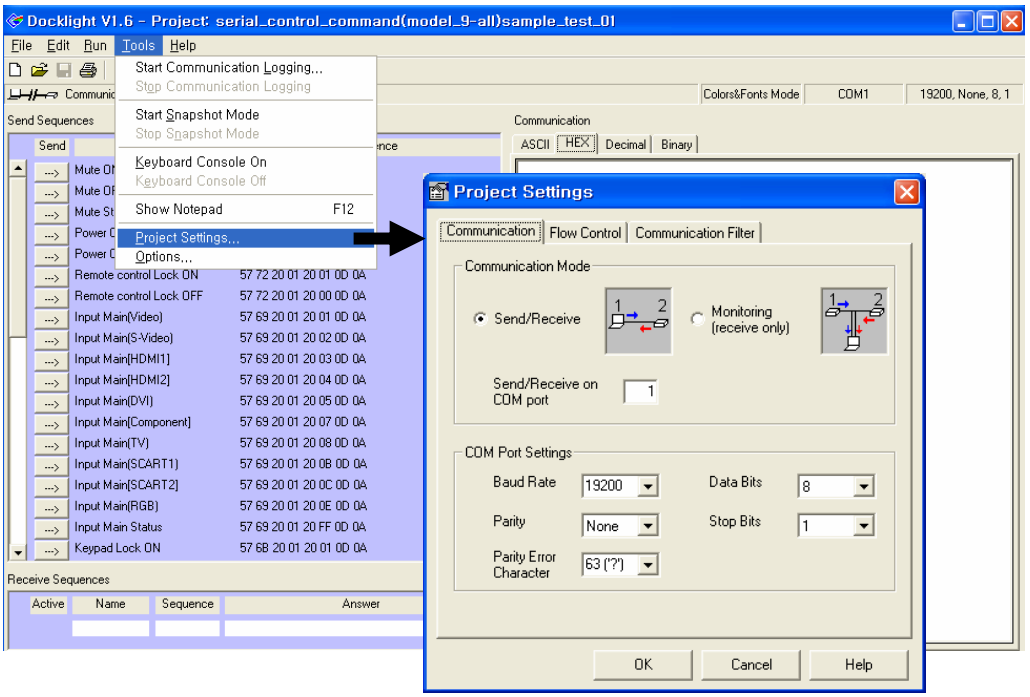
(21) Please check that Sound is good by pushing [-VOL+]key of front or remote control

10)RS232C Control TEST

(1) Please connect the Serial Port of PC and the RS232C Port of Main Board to 9 Pin D-SUB Cable

(2) Please execute the Docklight.exe

(3) Please choose Hardware Protocol as below.



- Baud rate : 19,200 bps
- Data bits : 8 bit
- Parity bits : NONE
- Stop bits : 1 bit
- Parity Error Character : Don't care

(4) Please check that RS232C CONTROL works well by putting the HEX MODE in program of Serial Test through referring to Serial Control Protocols Manual.

ex) MUTE ON/OFF TEST (PDP ID : 01)

Mute : m (0x6d)

▶ To Control Mute On/Off

(1) Transmission

[0x57][m][ ][Display ID][ ][Data][CR][LF]

Data = 0(00h) : Off -----→57 6D 20 01 20 00 0D 0A

Data = 1(01h) : On -----→57 6D 20 01 20 01 0D 0A

(2) OK Ack

[0x06]

(3) Error Ack

[0x15]

▶ Read Mute Status

(1) Transmission

[0x57][m][ ][PDP ID][ ][0xFF][CR] -----→57 6D 20 01 20 FF 0D 0A

(2) OK Ack

[Data]

Data = 0(00h) : Off Status

Data = 1(01h) : On Status

(3) Error Ack

[0x15]

(5) Please check Command for [Operation Time] and [Reversal Image] (Working at only RS232C CONTROL mode)

- [Operation Time] : Check operation time of PDP
- [Reversal Image] - ON : Check image is reversed
  - OFF : Check image is defaulted

11) Image Menu

(1) Please enter into Image MENU by pushing front key or MENU of REMOCON

Image
Brightness
Contrast
Sharpness
Color
Tint
Video Defaults

(2) Checking that adjustment can be possible for whatever user want to adjust by pushing front key or [▼ ▲],[-VOL+]KEY of REMOCON

- Brightness : Resolution
- Contrast : Contrast
- Sharpness : Clearance
- Color : the tone of color
- Tint : the depth of color
- Video Defaults: Image Mode first default

12) Screen

(1) enter into Screen MENU by pushing front key or MENU of REMOCON

Screen
Size
Freeze
Pixel Shift

(2) Please check following function can be working after selecting what function you want by

Pushing front KEY or [- VOL +],[▼ ▲]key of REMOCON

- Size : AUTO,FILL ALL, FILL ASPECT, ZOOM, ANAMORPHIC, WIDE,
- Freeze: Screen still
- Pixel Shift : Panel Burn-in Protection

(When it is on the working Sticking Minimum function prevents Panel Burn-in by moving screen as the left, the right or Up and down in a interval.)

13) Setup Menu

(1) Please enter into Image MENU by pushing front key or MENU of REMOCON

Setup
Language
Sleep Timer
OSD Setting
Menu Transparency
Menu Timeout
Color Temp.

(2) Check that adjustment can be possible for whatever user want to adjust by pushing [▼ ▲] and [-VOL+]key

- Language : Each country language (This is optional by buyer)
- Sleep Timer : Reservation of sleep time
- OSD Setting
  - * Menu Transparency : OSD the degree of clearness adjustment
  - * Menu Timeout : OSD Time adjustment
- Color Temp. : Choice color temperature(WARM/NORMAL/COOL)

14) Sound Menu

(1) Please check the volume of sound is adjustable by pushing front key or "-VOL+" KEY of REMOCON

(2) Please enter into Sound MENU by pushing front KEY or MENU KEY of REMOCON

Sound
Volume
Treble
Bass
Balance
Mute
Audio Defaults

(3) Checking that adjustment can be possible for whatever user want to adjust by pushing front key or [▼ ▲],[-VOL+]KEY of REMOCON

- Treble : High sound of Volume
- Bass : Low sound of Volume
- Balance : Sound balance
- Mute : Quiet
- Audio Defaults: returning to Audio first Mode

15) Remote controller Function Key Test

(1) Checking following details by pushing function key of REMOCON

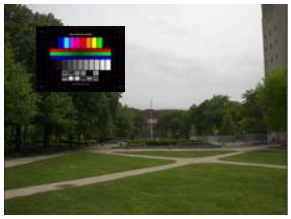
- Mute(Quietly) : Once pushed at one time sound is dead. Once pushed again return to the originated mode.
- Input : It help you see the input mode
- Auto(Auto setting) : It can help H.V position/Phase/Frequency searching automatically in RGB Input
- I.SIZE(Screen size) : It can help screen size change like AUTO,FILL ALL, FILL ASPECT, ZOOM, ANAMORPHIC, WIDE
- FREEZE(Screen freeze) : Once a time screen is freezed and Once pushed again it return to default
- Recall(Input expression) : It help viewing in present input signal
- Sleep(sleep timer) : It can reserve the sleeper time whenever you push button

(OFF -> 30Minute -> 60Minute -> 90 Minute -> 120 Minute -> 150 Minute -> 180 Minute)

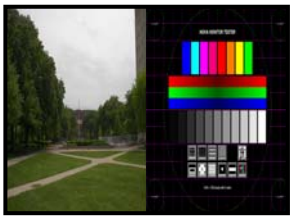
- Split Screen : Picture is changed like below when user push Split key of Remocon

Main

PIP



PBP



-

< Normal -> PIP -> PBP >

■ PIP Settings

Sub Input / Main Input	VIDEO 1	VIDEO 1	VIDEO	S-VIDEO
VIDEO 1	X	O	O	O
VIDEO 2	O	X	O	O
VIDEO	O	O	X	O
S-VIDEO	O	O	O	X
COMPONENT ◆	O	O	O	O
RGB ◆	O	O	O	O
DVI ◆	O	O	O	O

"◆" Max : 480p, 576p,1366 X 768/60Hz

In the PIP mode, the sub input source is differently defined for the default value(video1 or video2) depending on your PDP model

- Locate(Screen Position) : Please move PIP Position from PIP Mode
- SIZE : PIP SCREEN Size is changing in PIP Mode
- SWAP(Swap) : This function has main screen switch off sub screen
- A.SWAP(Audio Swap) : This function has sound of main screen switch off sub screen
- S.SELECT : This function help selecting the each screen from Split Screen

4. Out Going Specification

1) Menu Mode설정.

(1) Video1/2, Video, S-Video and Component Input

NO.	Menu	Function	Default	REMARK
1	Image	Brightness Contrast Sharpness Color Tint Video Defaults	050 050 002 050 050 [-VOL+] TO Restore Defaults	
2	Screen	Size Freeze Pixel Shift	AUTO OFF OFF	
3	Setup	Language Sleep Timer OSD Setting Menu Transparency Menu Timeout Color Temp.	English 000 000 020 NORMAL	
4	Audio	Volume Treble Bass Balance Mute Audio Defaults	30 050 050 050 OFF [-VOL+] TO Restore Defaults	

< Table 1 >

※ Image, Screen, Setup, Audio Menu is the same as < Table 1>

(2) RGB Input

NO.	Menu	Function	Default	REMARK
1	Image	Brightness	050	
		Contrast	050	
		Phase		
		Frequency		
		Sharpness	002	
		Video Defaults	[-VOL+] TO Restore Defaults	
2	Screen	Size	AUTO	
		H Position		
		V Position		
		Auto Positioning		
		Freeze	OFF	
		Pixel Shift	OFF	
3	Setup	Language	English	
		Sleep Timer	000	
		OSD Setting		
		Menu Transparency	000	
		Menu Timeout	020	
		Color Temp.	NORMAL	
4	Audio	Volume	30	
		Treble	050	
		Bass	050	
		Balance	050	
		Mute	OFF	
		Audio Defaults	[-VOL+] TO Restore Defaults	

< Table 2 >

(3) DVI Input

NO.	Menu	Function	Default	REMARK
1	Image	Brightness Contrast Sharpness Video Defaults	050 050 002 [-VOL+] TO Restore Defaults	
2	Screen	Size Freeze Pixel Shift	AUTO OFF OFF	
3	Setup	Language Sleep Timer OSD Setting Menu Transparency Menu Timeout Color Temp.	English 000 000 020 NORMAL	
4	Audio	Volume Treble Bass Balance Mute Audio Defaults	30 050 050 050 OFF [-VOL+] TO Restore Defaults	

< Table 3 >

9-BNC Firmware Upgrade Manual

Revision 0.1

(1) Connect PC and PDP with RS-232C Cable (1:1 Serial cable).

(2) Remove AC Power Cord from PDP for Power off.

(2) Run "C:\.....**FlashUpgrader.exe**".

(3) Click "**Flash**" button.

(4) Connect AC Power Cord of PDP.

(5) Right after connecting AC Power Cord, automatically up-grading.

(6) After finishing Up-grade, click " **Close** " button to end program.

(7) Remove RS-232C Cable (1:1 Serial Cable).

(8) Remove and reconnect AC Power Cord of PDP.

(9) Turn on PDP and Check the Panel Selection.(Default : 42" SD)

(10) If Panel Selection not corrected, Change the Panel selection.

(11) Value of Panel Selection can be changed as like below through.

Pushing [VOL+], [▼] and [▲] then [Panel Select] OSD is shown.

(12) Push [VOL-] or [VOL+] button to select panel.

000 : 42"SD(Default) panel is selected.

001 : 42"HD panel is selected.

002 : 50"HD or 60"HD panel is selected.

003 : LCD panel is selected.

(13) Pease push power button off and power button on after OSD menu is placed In the middle of screen by pushing **[MENU]** button – That means panel choice Is selected in right

(14) If OSD Menu is not placed in the middle of screen return to No.(11) as Pushing **[VOL+], [▼] and [▲]** button at the same time.

(15) Please check the correct panel by viewing OSD Menu after Power On.

- End -

● Purpose

This document describes how to operate the 9-Model Series, using the RS-232 Serial Communication Interface. This document defines all the command and messages exchanged between the Master (a PC or the other controller) and the Slave (the displays). It also describes the ways to send or read the commands or the messages.

● Protocol definition

SICP stands for “Serial Interface Communication Protocol”.
The protocol is specifically designed to allow data communication in half duplex multi-point environments, but it can also be used for half duplex point-to-point RS-232 communication.

● Communication characteristics

A half duplex communication is implemented starting from the concept of a master-slave structure, where the display is supposed to be the slave.
The first action is always taken by the master, which can be either a PC or any controlling device (acting as server) interfaced to the monitor. After sending a command or a request in the appropriate format the master receives from the slave an acknowledgement, which tells the transmitter whether the command is not valid (or not executable, anyway) or it is accepted.
In case of a request, the requested information is sent back and it becomes the acknowledgement by itself.

● How to connect a external equipment

Connect COM Port (9Pin D-Sub Port) of PC and RS-232C of Display with
RS-232C Cable(1:1 Serial cable)

● Hardware Protocol

Baud rate : 19,200 bps
Data bits : 8 bit
Parity bits : NONE
Stop bits : 1 bit
Handshake : NONE

● Transmission Formats

This is the format that the computer will send to the display to execute commands (such as Mute on, Mute off, etc.). The format for this command transmission is as follows:
[Manufacturer ID][Command][ ][Display ID][ ][Data][CR][LF]

Name	Description	ACSII code
Manufacturer ID	The ID of the Manufacturer	0x57
Command	The command to control the Display	
[ ]	Space	0x20
Display ID	The ID of the Display, from [001~254]	0x01~ 0xFE
[ ]	Space	0x20
Data	The data to be transmitted with the command	
CR	Carriage Return	0x0D
LF	Line Feed	0x0A

● OK Acknowledgement

The acknowledgement will be sent by the display to the computer to verify that the command has been successfully received and executed. This format for this acknowledgement is as follows:
[0x06]

● Error Acknowledgement

The Error Values will be sent by the display to the computer to verify that the command has been successfully received and executed. This format for this Error Values is as follows:
[0x15]

● ASCII code

(American Standard Code for Information Interchange)

*	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	TAB	LF	VT	FF	CR	SO	SI
1	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2		!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	

Example 1: ‘A’ character = 4th row, 1st column => Hex : 0x41 , Decimal : 65

● HOW to Choose Display ID number.

The adjustment range of Set ID is 001 ~ 254.

▶ To Choose Display ID number
(1) Transmission
[0x57][?][ ][0x00][ ][Data][CR][LF]
Data = 001(01h)
.
.
Data = 128(80h)
.
.
Data = 254(FEh)
(2) OK Ack
[0x06]
(3) Error Ack
[0x15]

▶ Read Display ID number
(1) Transmission
[0x57][?][ ][0x00][ ][0xFF][CR][LF]
(2) OK Ack
[Data]
Data = 001(01h)
.
.
Data = 128(80h)
.
.
Data = 254(FEh)
(3) Error Ack
[0x15]

● Command List

Name	Command	Data(HEX)	Name	Command	Data(HEX)
1. Mute	m (0x6d)	00h ~ 01h	2. Power	p (0x70)	00h ~ 01h
3. Remote Control Lock	r (0x72)	00h ~ 01h	4. Input (Main)	i (0x69)	01h ~ 0Eh
5. Keypad Lock	k (0x6b)	00h ~ 01h	6. Operation Time	O (0x6f)	01h
7. Reversal Image	b (0x62)	00h ~ 01h	8. Volume	v (0x76)	28h ~ 64h
9. Split (PIP/PBP)	s (0x73)	00h ~ 02h	10. Input (Sub)	I (0x49)	01h ~ 0Ch

1. Mute : m (0x6d)

▶ To Control Mute On/Off

(1) Transmission

[0x57][m][ ][Display ID][ ][Data][CR][LF]

Data = 0(00h) : Off

Data = 1(01h) : On

(2) OK Ack

[0x06]

(3) Error Ack

[0x15]

▶ Read Mute Status

(1) Transmission

[0x57][m][ ][Display ID][ ][0xFF][CR][LF]

(2) OK Ack

[Data]

Data = 0(00h) : Off Status

Data = 1(01h) : On Status

(3) Error Ack

[0x15]

2. Power : p (0x70)

▶ To Control Power On/Off of the Display

(1) Transmission

[0x57][p][ ][Display ID][ ][Data][CR][LF]

Data = 0(00h) : Off

Data = 1(01h) : On (Display ID=[0x00] Fix)

(2) OK Ack

[0x06]:Off , [0xBE..,0xBF..,0xEF..]:On

(3) Error Ack

[0x15]:Off , [X]:On

▶ Read Power Status

(1) Transmission

[0x57][p][ ][Display ID][ ][0xFF][CR][LF]

(2) OK Ack

[Data]

Data = X(Don't care) : Off Status

Data = 1(01h) : On Status

(3) Error Ack

[0x15]

3. Remote Control Lock : r (0x72)

▶ To Control Remote Control Lock On/Off

(1) Transmission

[0x57][r][ ][Display ID][ ][Data][CR][LF]

Data = 0(00h) : Off

Data = 1(01h) : On

(2) OK Ack

[0x06]

(3) Error Ack

[0x15]

▶ Read Remote Control Lock Status

(1) Transmission

[0x57][r][ ][Display ID][ ][0xFF][CR][LF]

(2) OK Ack

[Data]

Data = 0(00h) : Off Status

Data = 1(01h) : On Status

(3) Error Ack

[0x15]

4. Input(Main) : i (0x69)

▶ To Select Input(Main) of the Display

(1) Transmission

[0x57][i][ ][Display ID][ ][Data][CR][LF]

Data = 08(08h) : TV (Option)

Data = 11(0Bh) : SCART 1 or VIDEO 1

Data = 12(0Ch) : SCART 2 or VIDEO 2

Data = 01(01h) : VIDEO

Data = 02(02h) : S-VIDEO

Data = 07(07h) : COMPONENT

Data = 14(0Eh) : RGB

Data = 05(05h) : DVI

Data = 03(03h) : HDMI 1 (Option)

Data = 04(04h) : HDMI 2 (Option)

(2) OK Ack

[0x06]

(3) Error Ack

[0x15]

▶ Read Input(Main) Status

(1) Transmission

[0x57][i][ ][Display ID][ ][0xFF][CR][LF]

(2) OK Ack

[Data]

Data = 08(08h) : TV (Option) Status

Data = 11(0Bh) : SCART 1 or VIDEO 1 Status

Data = 12(0Ch) : SCART 2 or VIDEO 2 Status

Data = 01(01h) : VIDEO Status

Data = 02(02h) : S-VIDEO Status

Data = 07(07h) : COMPONENT Status

Data = 14(0Eh) : RGB Status

Data = 05(05h) : DVI Status

Data = 03(03h) : HDMI 1 (Option) Status

Data = 04(04h) : HDMI 2 (Option) Status

(3) Error Ack

[0x15]

5. Keypad Lock : k (0x6b) ▶ To Control Keypad Lock On/Off (1) Transmission **[0x57][k][ ][Display ID][ ][Data][CR][LF]** Data = 0(00h) : Off Data = 1(01h) : On (2) OK Ack **[0x06]** (3) Error Ack **[0x15]** ▶ Read Keypad Lock Status (1) Transmission **[0x57][k][ ][Display ID][ ][0xFF][CR][LF]** (2) OK Ack **[Data]** Data = 0(00h) : Off Status Data = 1(01h) : On Status (3) Error Ack **[0x15]**	**6. Operation Time : o (0x6f)** ▶ To Read Operation Time of the Display (1) Transmission **[0x57][o][ ][Display ID][ ][Data][CR][LF]** Data = 1(01h) : On (OSD Menu) (2) OK Ack **[0x06]** (3) Error Ack **[0x15]**
7. Reversal Image : b (0x62) **Only PDP ▶ To Control Reversal Image On/Off (1) Transmission **[0x57][b][ ][Display ID][ ][Data][CR][LF]** Data = 0(00h) : Off Data = 1(01h) : On (2) OK Ack **[0x06]** (3) Error Ack **[0x15]** ▶ Read Reversal Image Status (1) Transmission **[0x57][b][ ][Display ID][ ][0xFF][CR][LF]** (2) OK Ack **[Data]** Data = 0(00h) : Off Status Data = 1(01h) : On Status (3) Error Ack **[0x15]**	**8. Volume : v (0x76)** ▶ To Control Volume (1) Transmission **[0x57][v][ ][Display ID][ ][Data][CR][LF]** Data = 040(28h) : Volume 00 Data = 041(29h) : Volume 01 . Data = 055(37h) : Volume 15 Data = 056(38h) : Volume 16 . Data = 070(46h) : Volume 30 Data = 071(47h) : Volume 31 . Data = 085(55h) : Volume 45 Data = 086(56h) : Volume 46 . Data = 100(64h) : Volume 60 (2) OK Ack **[0x06]** (3) Error Ack **[0x15]** ▶ Read Volume Status (1) Transmission **[0x57][v][ ][Display ID][ ][0xFF][CR][LF]** (2) OK Ack **[Data]** Data = 040(28h) : Volume 00 Status Data = 041(29h) : Volume 01 Status . Data = 055(37h) : Volume 15 Status Data = 056(38h) : Volume 16 Status . Data = 070(46h) : Volume 30 Status Data = 071(47h) : Volume 31 Status . Data = 085(55h) : Volume 45 Status Data = 086(56h) : Volume 46 Status . Data = 100(64h) : Volume 60 Status (3) Error Ack **[0x15]**

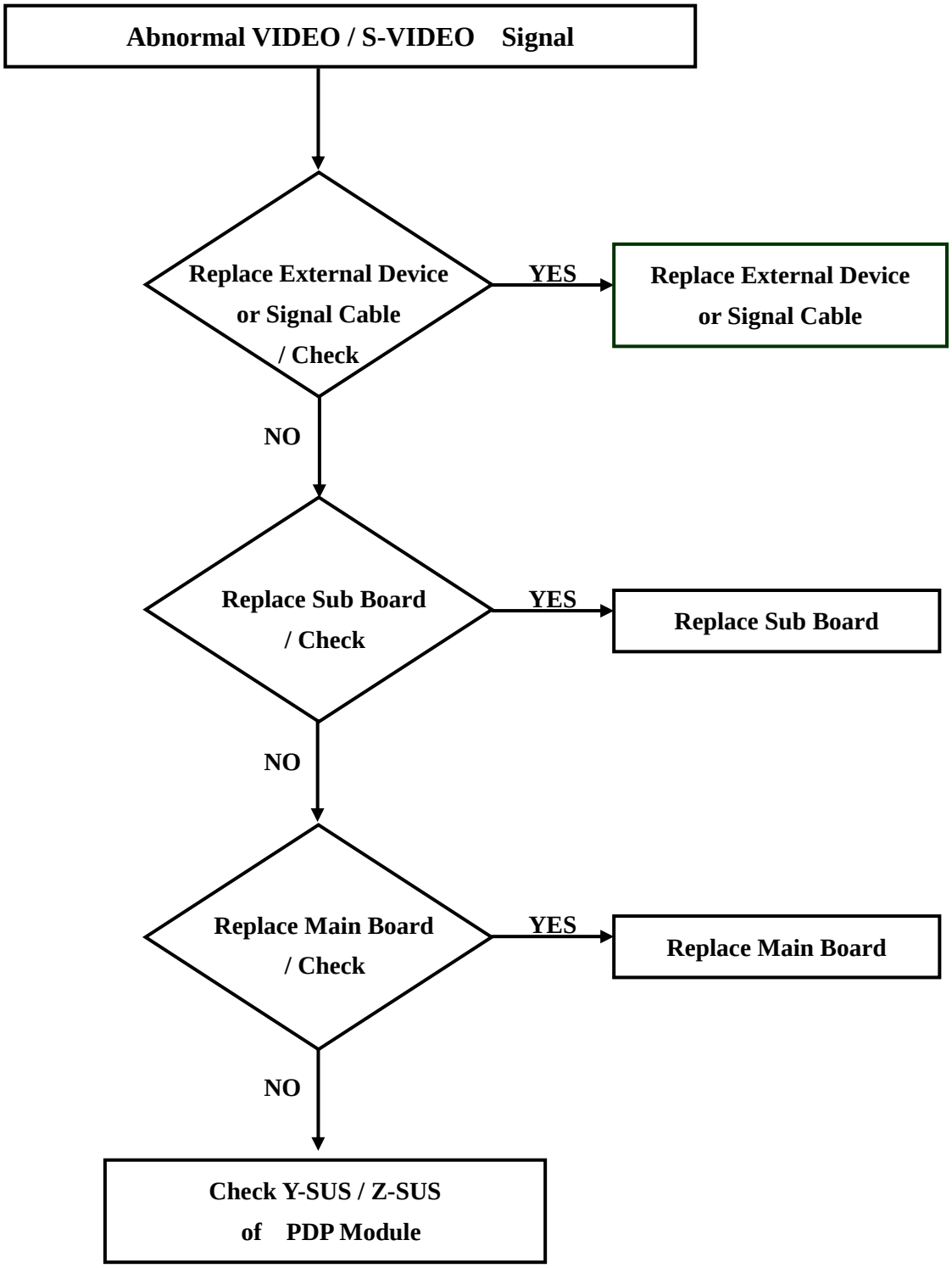
9. Split(PIP/PBP) : s (0x73) **Option ▶ To Select Split(PIP/PBP) (1) Transmission **[0x57][s][ ][Display ID][ ][Data][CR][LF]** Data = 00(00h) : NORMAL Data = 01(01h) : PIP (Option) Data = 02(02h) : PBP (Option) (2) OK Ack **[0x06]** (3) Error Ack **[0x15]** ▶ Read Split(PIP/PBP) Status (1) Transmission **[0x57][s][ ][Display ID][ ][0xFF][CR][LF]** (2) OK Ack **[Data]** Data = 00(00h) : NORMAL Status Data = 01(01h) : PIP (Option) Status Data = 02(02h) : PBP (Option) Status (3) Error Ack **[0x15]**	**10. Input(Sub) : I (0x49) **Option** ▶ To Select Input(Sub) of the Display (1) Transmission **[0x57][I][ ][Display ID][ ][Data][CR][LF]** Data = 08(08h) : TV (Option) Data = 11(0Bh) : SCART 1 or VIDEO 1 Data = 12(0Ch) : SCART 2 or VIDEO 2 Data = 01(01h) : VIDEO Data = 02(02h) : S-VIDEO (2) OK Ack **[0x06]** (3) Error Ack **[0x15]** ▶ Read Input(Sub) Status (1) Transmission **[0x57][I][ ][Display ID][ ][0xFF][CR][LF]** (2) OK Ack **[Data]** Data = 08(08h) : TV (Option) Status Data = 11(0Bh) : SCART 1 or VIDEO 1 Status Data = 12(0Ch) : SCART 2 or VIDEO 2 Status Data = 01(01h) : VIDEO Status Data = 02(02h) : S-VIDEO Status (3) Error Ack **[0x15]**

● Few examples of the commands:

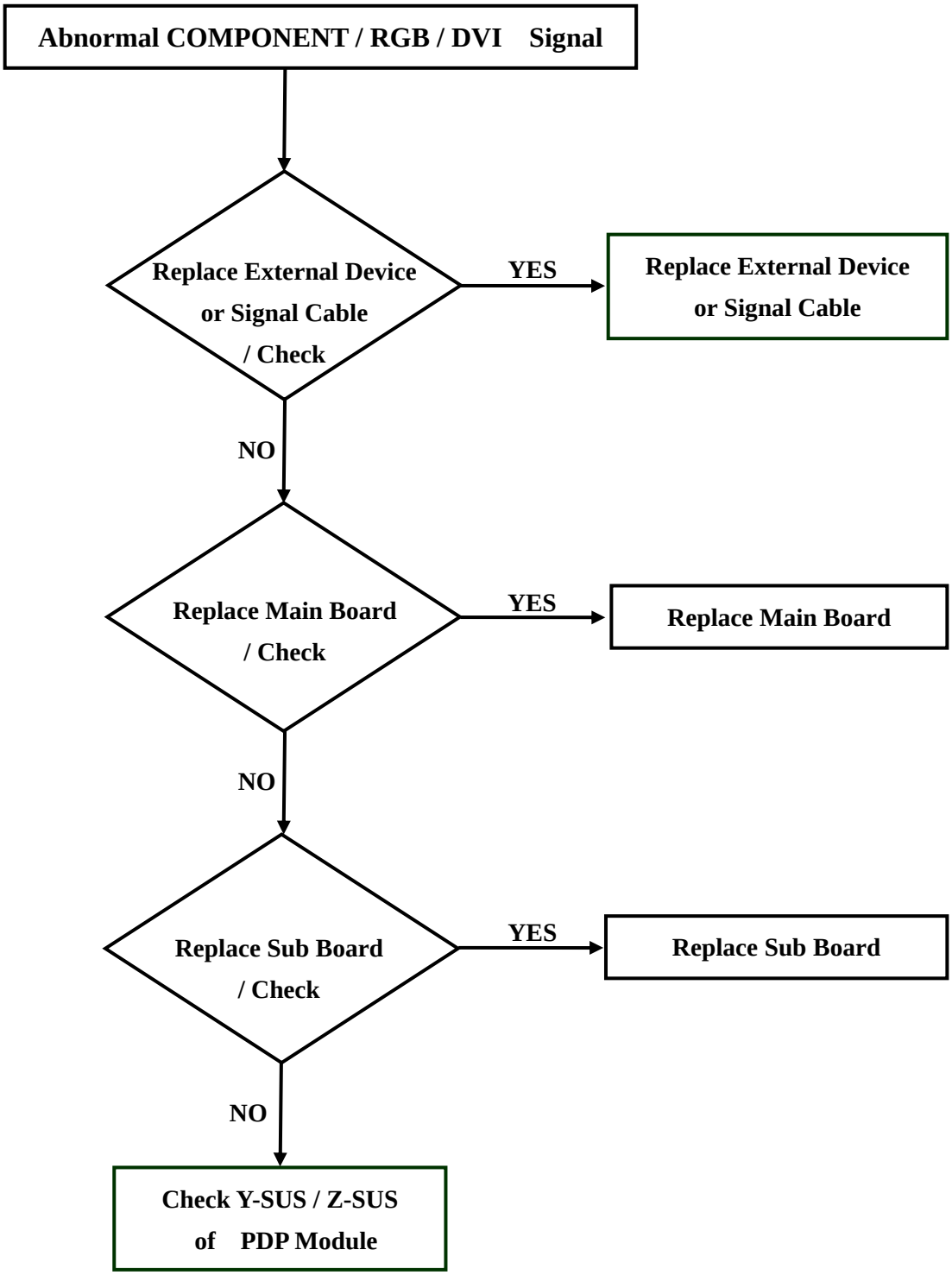
Choose PDP ID on 001 ->	57 3F 20 00 20 01 0D 0A
Choose PDP ID on 002 ->	57 3F 20 00 20 02 0D 0A
Read PDP ID ->	57 3F 20 00 20 FF 0D 0A
Power On (ID: 000) ->	57 70 20 00 20 01 0D 0A
Power Off (ID: 001) ->	57 70 20 01 20 00 0D 0A
Power Read (ID: 001) ->	57 70 20 01 20 FF 0D 0A
Remote Control unlock (ID: 001) ->	57 72 20 01 20 00 0D 0A
Remote Control lock (ID: 001) ->	57 72 20 01 20 01 0D 0A
Remote Control Read (ID: 001) ->	57 72 20 01 20 FF 0D 0A
Input Scart 1 (ID: 001) ->	57 69 20 01 20 0B 0D 0A
Input DVI (ID: 001) ->	57 69 20 01 20 05 0D 0A
Input Read (ID: 001) ->	57 69 20 01 20 FF 0D 0A

Trouble Shooting

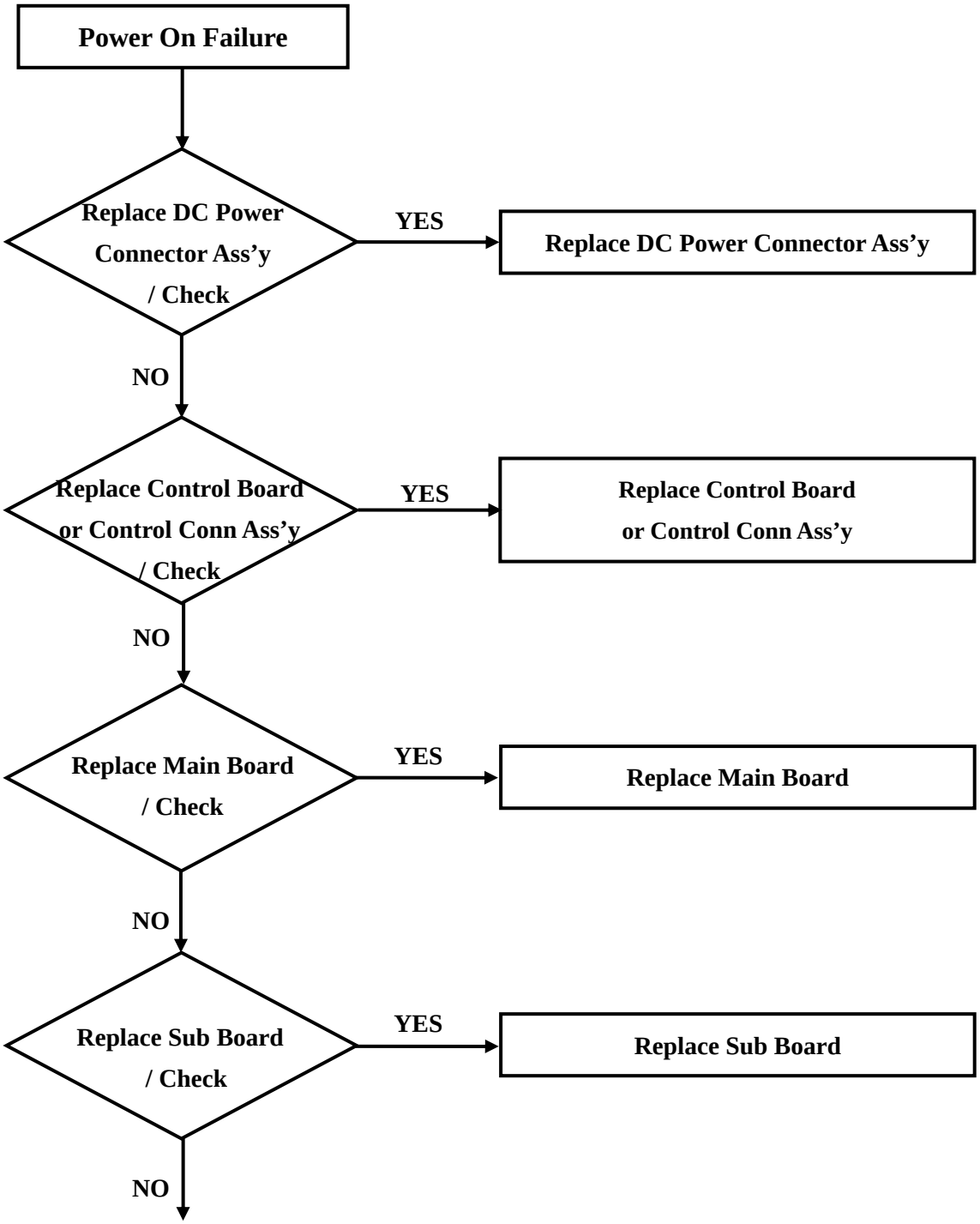
< Abnormal VIDEO / S-VIDEO Signal>



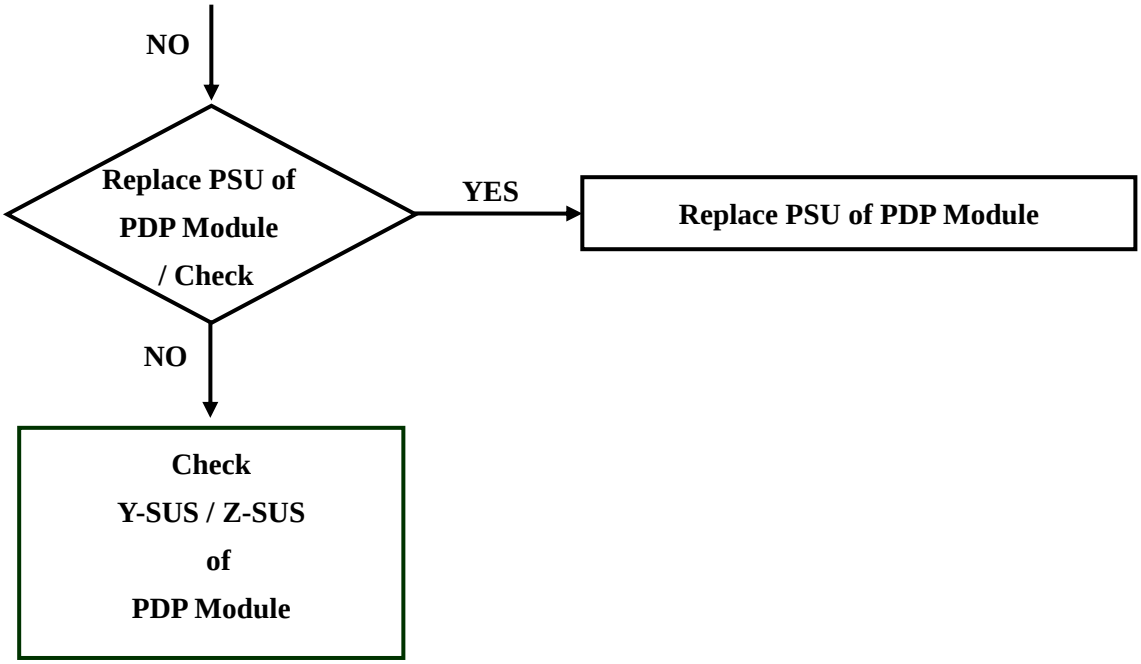
< Abnormal COMPONENT / RGB / DVI Signal >



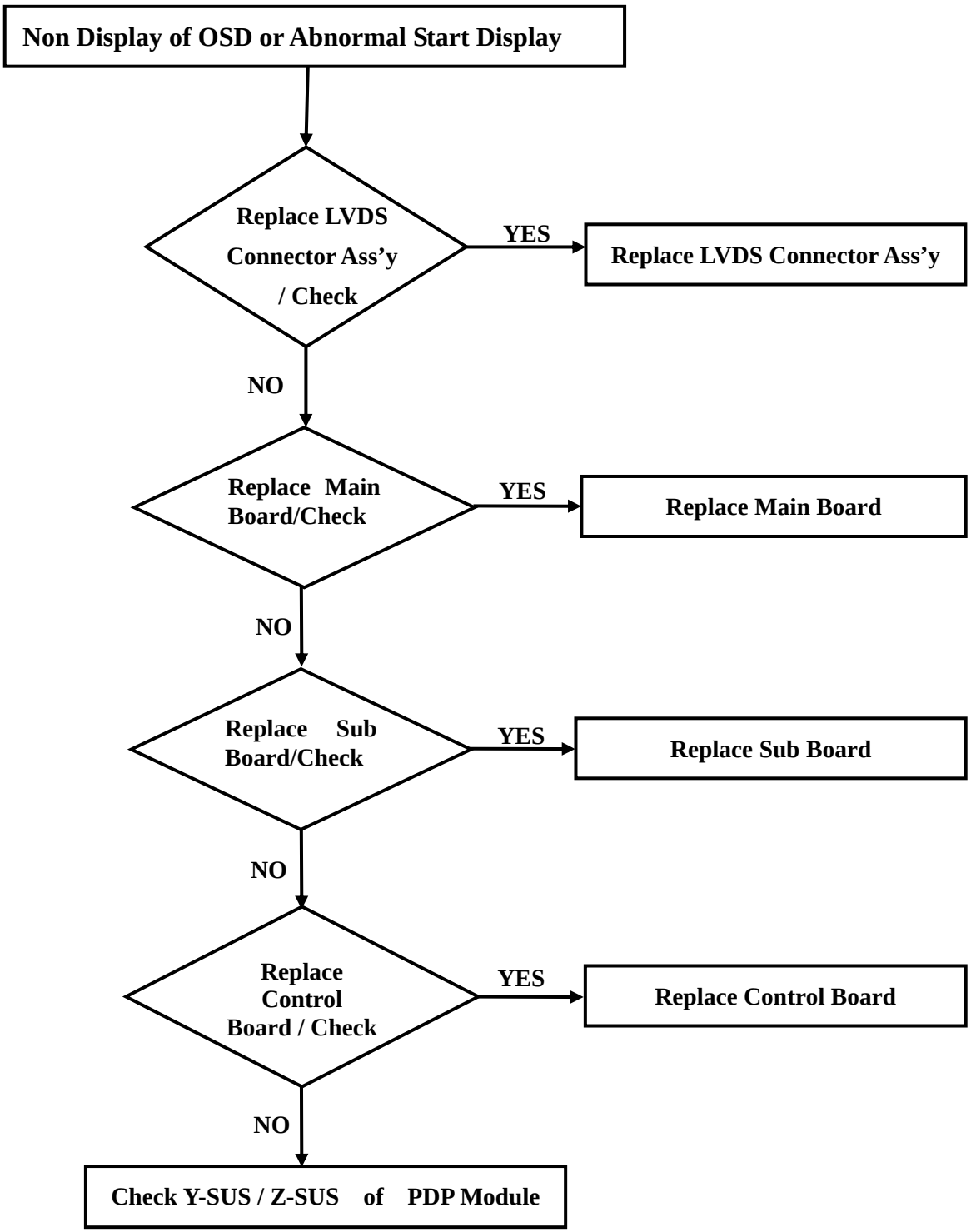
< Power On Failure >(Continued)



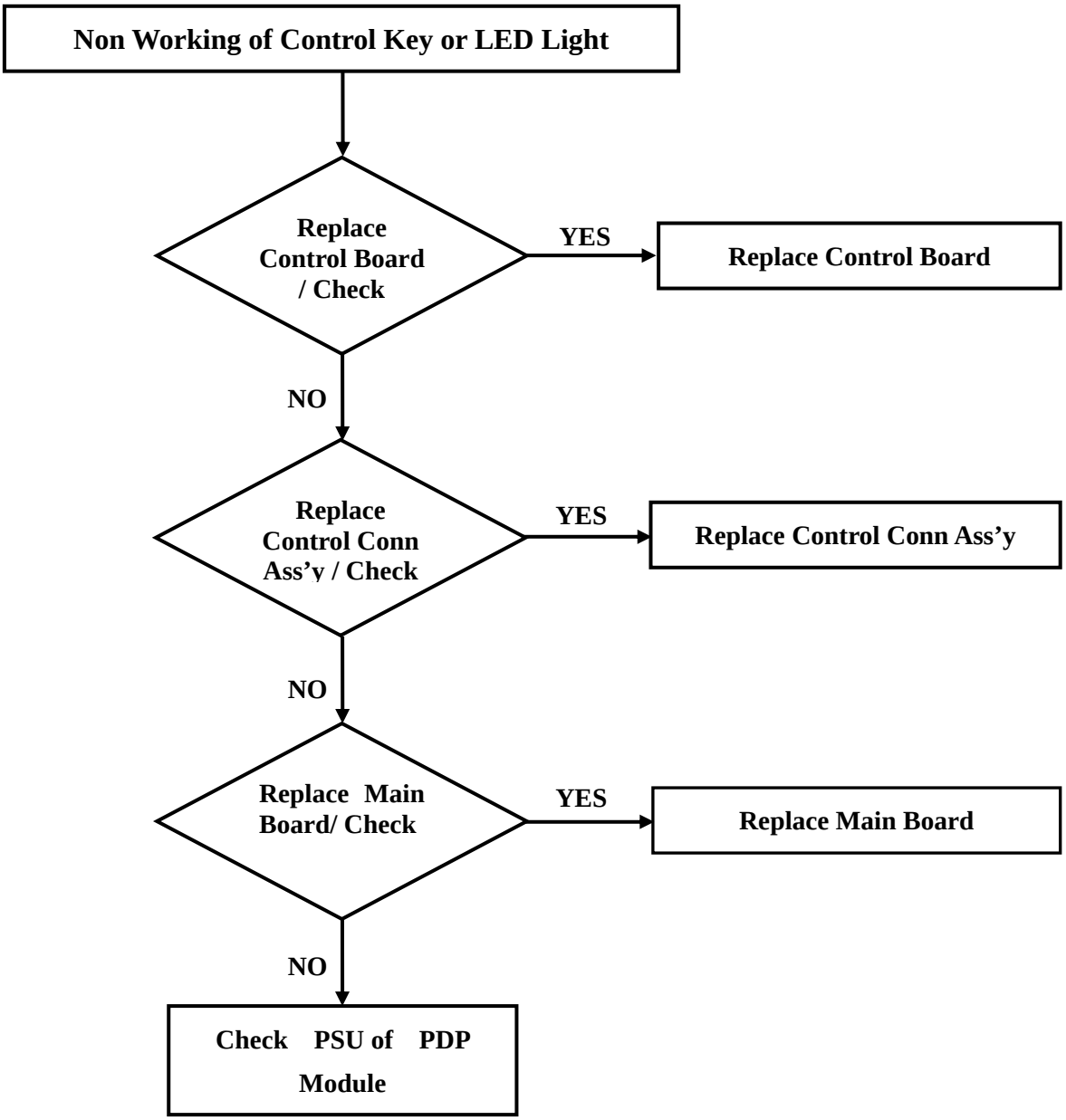
< Power On Failure >



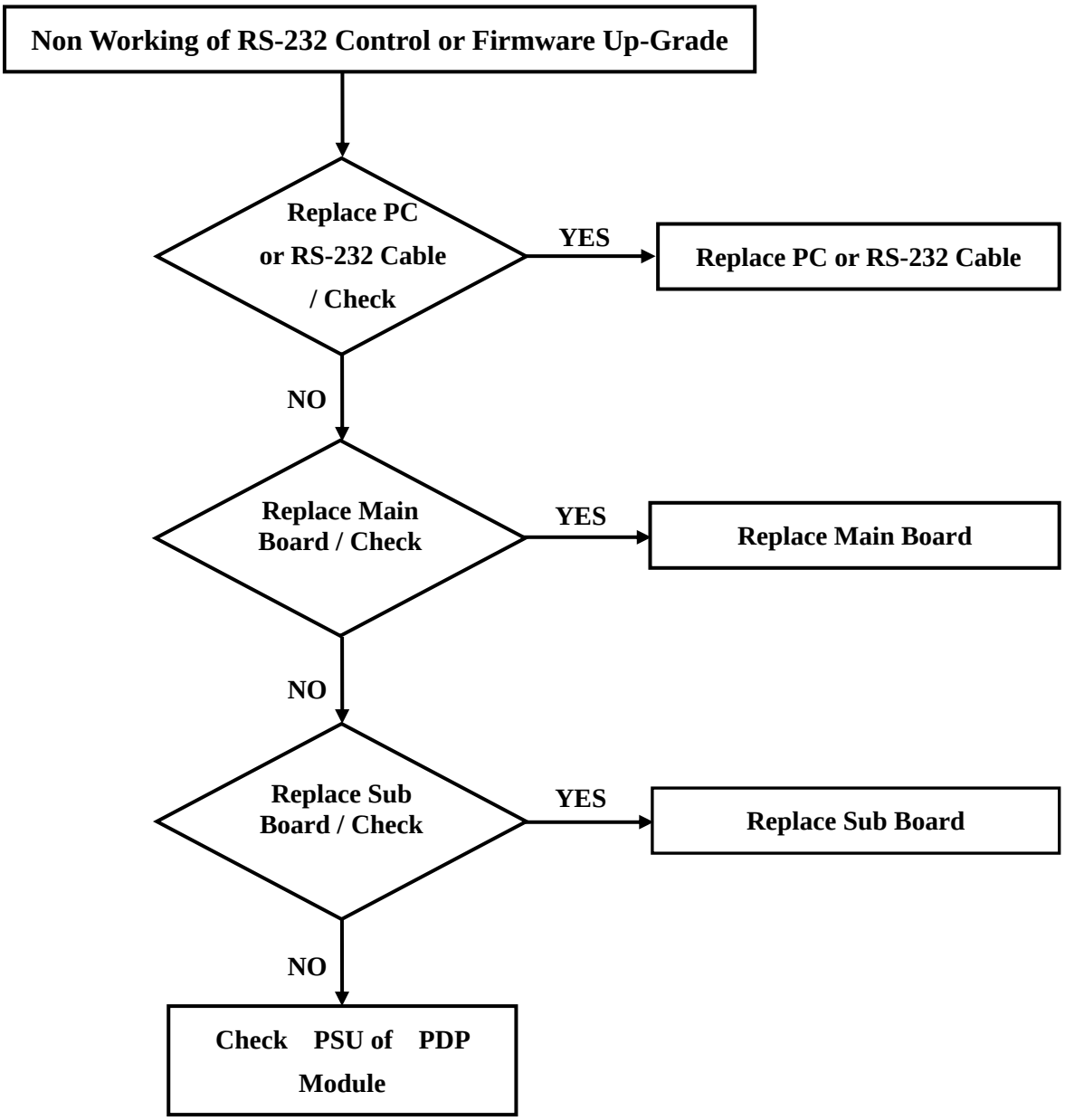
< Non Display of OSD or Abnormal Starting Display >



<Non Working of Control Key or LED Light>



<Non Working of RS-232 Control or Firmware Up-Grade>



PDP MODULE SERVICE MANUAL

1. **PDP42X3####**
2. **PDP50X3####**
3. **PDP60X6####**

CAUTION

1. BEFORE SERVICING THE PDP MODULE,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.
2. WHEN REPLACEMENT PARTS ARE REQUIRED, BE SURE TO USE
REPLACEMENT PARTS SPECIFIED BY THE MANUFACTURER.

1. PDP42X3#### Module

CONTENTS

Ⅰ. Safety Precautions
Ⅱ. Technical Feature
Ⅲ. Formation and Specification of Module
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2. Information of Boards
3. Label information of Module
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2-2. 1/4 of the screen doesn't be shown
2-3. Screen doesn't be shown as Data TCP
2-4. It is generated unusual pattern of Data TCP IC unit
2-5. Screen doesn't be shown at all as Scan FPC
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2-7. Data copy is generated to stripe direction
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Ⅵ. Critical Components List
Ⅶ. Records of Revision for Boards, Components and ROM DATA

*** Annexing : Schematic Diagram**

Ⅰ. Safety Precautions

When servicing of PDP Module, it should be not enforced into another way aside next rule, or a unaccustomed person should not repairing.
When using/handling this PDP Module, pay attention to the below warning and cautions.

⚠ Warning

Indicates a hazard that may lead to death or injury if the warning is ignored and the product is handled incorrectly.

⚠ Caution

Indicates a hazard that can lead to injury or damage to property if the caution is ignored and the product is handled incorrectly.

1. WARNING

(1) Do not touch Signal and Power Connector while this product operates.
Do not touch EMI ground part and Heat Sink of Film Filter.

(2) Do not supply a voltage higher than that specified to this product. This may damage the product and may cause a fire.

(3) Do not use this product in locations where the humidity is extremely high, where it may be splashed with water, or where flammable materials surround it.
Do not install or use the product in a location that does no satisfy the specified environmental conditions. This may damage the product and may cause a fire.

(4) If a foreign substance (such as water, metal, or liquid) gets inside the product, immediately turn off the power.
Continuing to use the product, it is may cause fire or electric shock.

(5) If the product emits smoke, and abnormal smell, or makes an abnormal sound, immediately turn off the power.
Continuing to use the product, it may cause fire or electric shock.

(6) Do not disconnect or connect the connector while power to the product is on. It takes some time for the voltage to drop to a sufficiently low level after the power has been turned off.
Confirm that the voltage has dropped to a safe level before disconnecting or connecting the connector.

(7) Do not pull out or insert the power cable from/to an outlet with wet hands. It may cause electric shock.

(8) Do not damage or modify the power cable. It may cause fire or electric shock.

(9) If the power cable is damaged, or if the connector is loose, do not use the product : otherwise, this can lead to fire or electric shock.

(10) If the power connector or the connector of the power cable becomes dirty or dusty, wipe it with a dry cloth. Otherwise, this can lead to fire.

(11) PDP Module uses a high voltage (Max.450V dc). Keep the cautions concerning electric shock and do not touch the Device circuitry when handling the PDP Unit. And because the capacitor of the Device circuitry may remain charged at the moment of Power OFF, standing by for 1 minute is required in order to touch the Device circuitry.

2. CAUTIONS

(1) Do not place this product in a location that is subject to heavy vibration, or on an unstable surface such as an inclined surface. The product may fall off or fall over, causing injuries.

(2) Before disconnecting cable from the product, be sure to turn off the power. Be sure to hold the connector when disconnecting cables. Pulling a cable with excessive force may cause the core of the cable to be exposed or break the cable, and this can lead to fire or electric shock.

(3) This product should be moved by two or more persons. If one person attempts to carry this product alone, he/she may be injured.

(4) This product contains glass. The glass may break, causing injuries, if shock, vibration, heat, or distortion is applied to the product.

(5) The temperature of the glass of the display may rise to 80°C or more depending on the conditions of use.
If you touch the glass inadvertently, you may be burned.

(6) If glass surface of the display breaks or is scratched, do not touch the broken pieces or the scratches with bare hands. You may be injured.

(7) PDP Module requires to be handled with care not to be touched with metal or hard materials, and must not be stressed by heat or mechanical impact.

(8) There are some exposed components on the rear panel of this product. Touching these components may cause an electric shock.

(9) When moving the product, be sure to turn off the power and disconnect all the cables. While moving the product, watch your step. The product may be dropped or all, leading to injuries of electric shock.

English

(10) In order to protect static electricity due to C-MOS circuitry of the Drive part, wear a wrist band to protect static electricity when handling.

(11) If cleaning the Panel, wipe it with a soft cloth moistened with water or a neutral detergent and squeezed, being careful not to touch the connector part of the Panel. And don't use chemical materials like thinner or benzene.

(12) If this product is used as a display board to display a static image, "image sticking" occurs. This means that the luminance of areas of the display that remain lit for a long time drops compared with luminance of areas that are lit for a shorter time, causing uneven luminance across the display.
The degree to which this occurs is in proportion to the luminance at which the display is used. To prevent this phenomenon, therefore, avoid static images as much as possible and design your system so that it is used at a low luminance, by reducing signal level difference between bright area and less bright area through signal processing.

(13) Because PDP Module emits heat from the Glass Panel part and the Drive circuitry, the environmental temperature must not be over 40°C.
The temperature of the Glass Panel part is especially high owing to heat from internal Drive circuitry. And because the PDP Module is driven by high voltage, it must avoid conductive materials.

(14) If inserting components or circuit board in order to repair, be sure to fix a lead line to the connector before soldering.

(15) If inserting high-power resistor(metal-oxide film resistor or metal film resistor) in order to repair, insert it as 10mm away as from a board.

(16) During repairs, high voltage or high temperature components must be put away from a lead line.

(17) This is a Cold Chassis but you had better use a cold transformer for safety during repairs. If repairing electricity source part, you must use the cold transformer.

(18) Do not place an object on the glass surface of the display. The glass may break or be scratched.

(19) This product may be damaged if it is subject to excessive stresses (such as excessive voltage, current, or temperature). The absolute maximum ratings specify the limits of these stresses.

(20) The recommended operating conditions are conditions in which the normal operation of this product is guaranteed. All the rated values of the electrical specifications are guaranteed within these conditions.
Always use the product within the range of the recommended operating conditions. Otherwise, the reliability of the product may be degraded.

(21) This product has a glass display surface. Design your system so that excessive shock and load are not applied to the glass. Exercise care that the vent at the corner of the glass panel is not damaged.
If the glass panel or vent is damaged, the product is inoperable.

(22) Do not cover or wrap the product with a cloth or other covering while power is supplied to the product.

(23) Before turning on power to the product, check the wiring of the product and confirm that the supply voltage is within the rated voltage range. If the wiring is wrong or if a voltage outside the rated range is applied, the product may malfunction or be damaged.

(24) Do not store this product in a location where temperature and humidity are high. This may cause the product to malfunction. Because this product uses a discharge phenomenon, it may take time to light (operation may be delayed) when the product is used after it has been stored for a long time. In this case, it is recommended to light all cells for about 2 hours (aging).

(25) This product is made from various materials such as glass, metal, and plastic. When discarding it, be sure to contact a professional waste disposal operator.

(26) If faults occur due to arbitrary modification or disassembly, LG Electronics is not responsible for function, quality or other items.

(27) Use of the product with a combination of parameters, conditions, or logic not specified in the specifications of this product is not guaranteed. If intending to use the product in such a way, be sure to consult LGE in advance.

(28) Within the warranty period, general faults that occur due to defects in components such as ICs will be rectified by LGE without charge. However, IMAGE STICKING due to misapplying the above (12) provision is not included in the warranty. Repairs due to the other faults may be charged for depending on responsibility for the faults.

(29) In assembling Module into SET, in case Film Filter and as a protective film is bared, static electricity of exfoliated protective film which is bared from beginning X-Board down ward getting TCP to no getting TCP should not influence on TCP. Also Filter after protective film is bared or in the storage can be charged with electricity, so the EMI ground part of Film Filter should be used after Grounding.

3. Warning label for PDP Module

1) PCB Warning label

(1)Warning

Warning against any dangers under certain circumstance.

(2)Hot surface

Warning against any possibilities of injury or burn due to high temperature under certain circumstance.

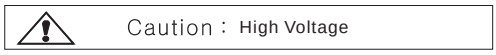
(3)Dangerous voltage

Warning against the possibility of electric shock under certain circumstance.

(4)Electrostatic sensitive devices

Warning against any possibilities of electric shock/high temperature by touching under certain circumstance

(5)Caution sentence



Warning against high voltage under certain position.

(6) Fuse Caution sentence

CAUTION
FOR CONTINUED PROTECTION AGAINST RISK OF FIRE,
REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE(S).

The fuse should be replaced with the same type and rating to prevent fire under certain circumstance

2) Safety precautions on Module

(1)High Voltage

Warning against the danger of electric shock when touching due to dangerous high voltage.

(2)Hot Surface

Warning against the danger of burn when touching due to high temperature parts.

(3)Wound

Caution against the danger of mechanical injuries.

English

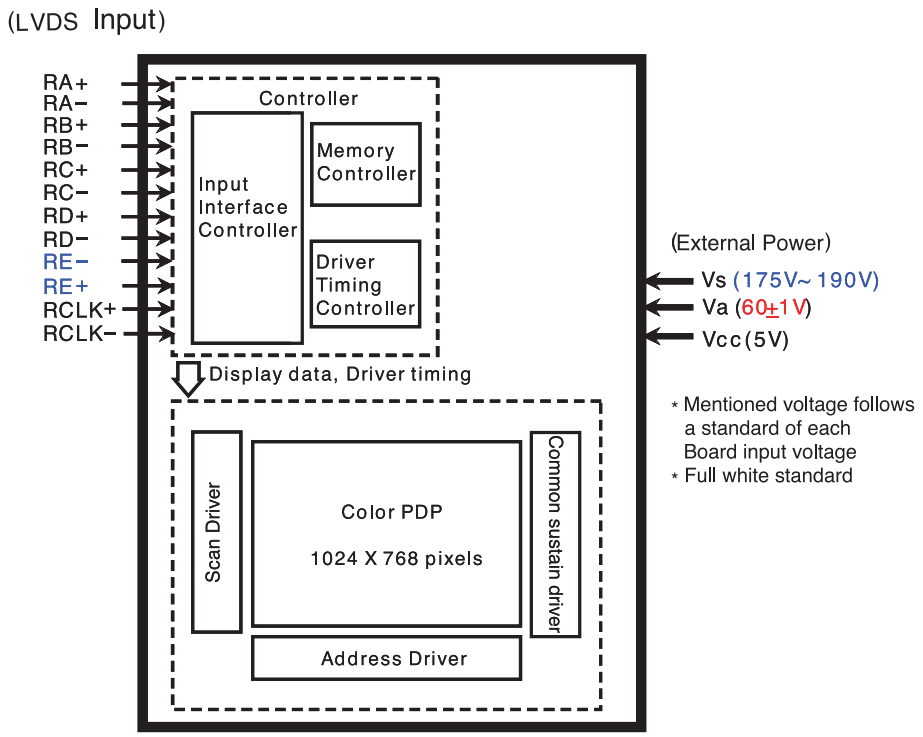
Ⅱ. Technical Feature

PDP Module is a display device to be divided into a Panel part and a Drive part. The Panel part consists of Electrodes, Phosphor, various dielectrics and gas, and the Drive part includes electronic circuitry and PCB.
PDP42X3#### model produced in the LG electronics is 42inches color Plasma display module of Wide XGA(1024(H) x 768(V)), and it is a display device giving concrete to bright image by using AC Plasma technology of LG electronics.

1) General Specification

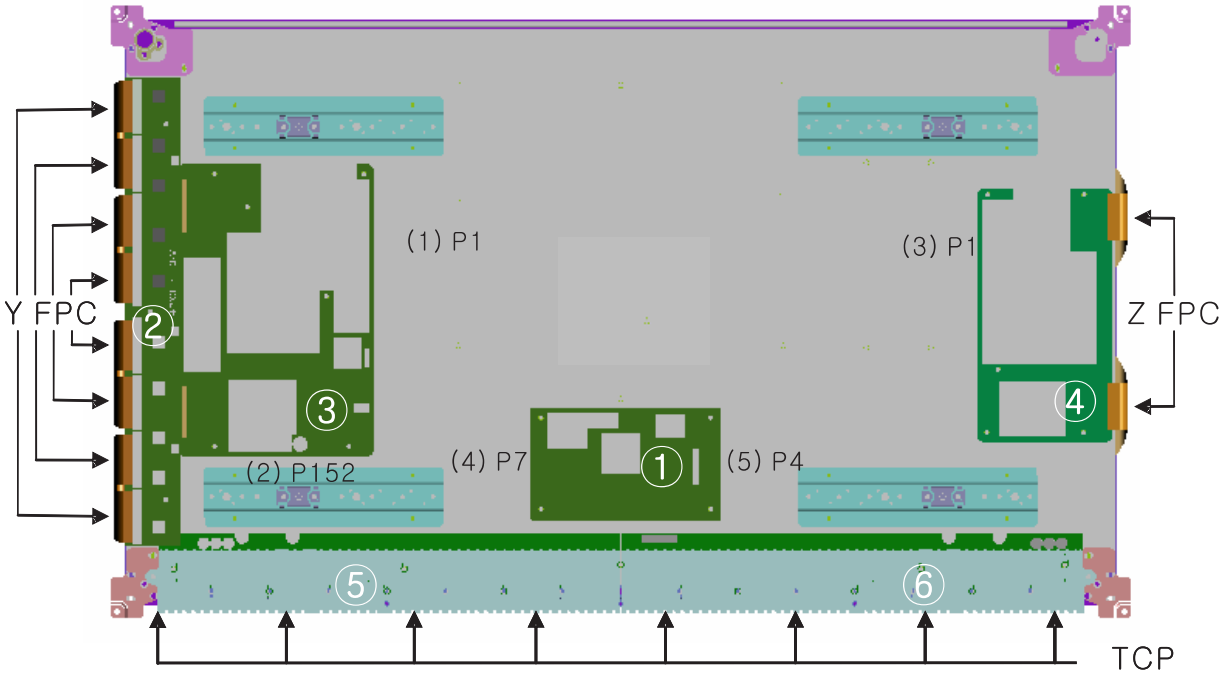
(1) Model Name	:	PDP42X3####
(2) Number of Pixel	:	1024(H) × 768(V) (1pixel=3 RGB cells)
(3) Pixel Pitch	:	900㎛(H) × 676㎛(V)
(4) Cell Pitch	:	300㎛(H) × 676㎛(V) (Base : Green Cell)
(5) Display area	:	921.6(H) × 519.2(V) ±0.5(mm)
(6) Outline dimension	:	1005(H) × 597(V)x 61.2(D) ±1(mm)
(7) Color arrangement	:	RGB Closed(Well) type
(8) Number of COLRO	:	(R)1024 × (G)1024 × (B)1024(10,737,400,000)
(9) Weight	:	15.3 ±0.5(Kg) : Net
	:	113.5 ±5(Kg) : 5EA/1BOX
(10) Aspect Ratio	:	16:9
(11) Peak Brightness	:	Typical 1200cd/㎡(1% White Window)
	:	Typical 140:1(Light room 100 Lx at center)
(12) Contrast Ratio	:	Typical 10,000:1(Dark room 1% White Window) (White Window Pattern at Center)
(13) POWER CONSUMPTION	:	Max 330 W(Full White)
(14) Lifetime	:	Over 60,000 Hrs (Initial brightness 1/2)

2) Block Diagram



Ⅲ. Formation and Specification of Module

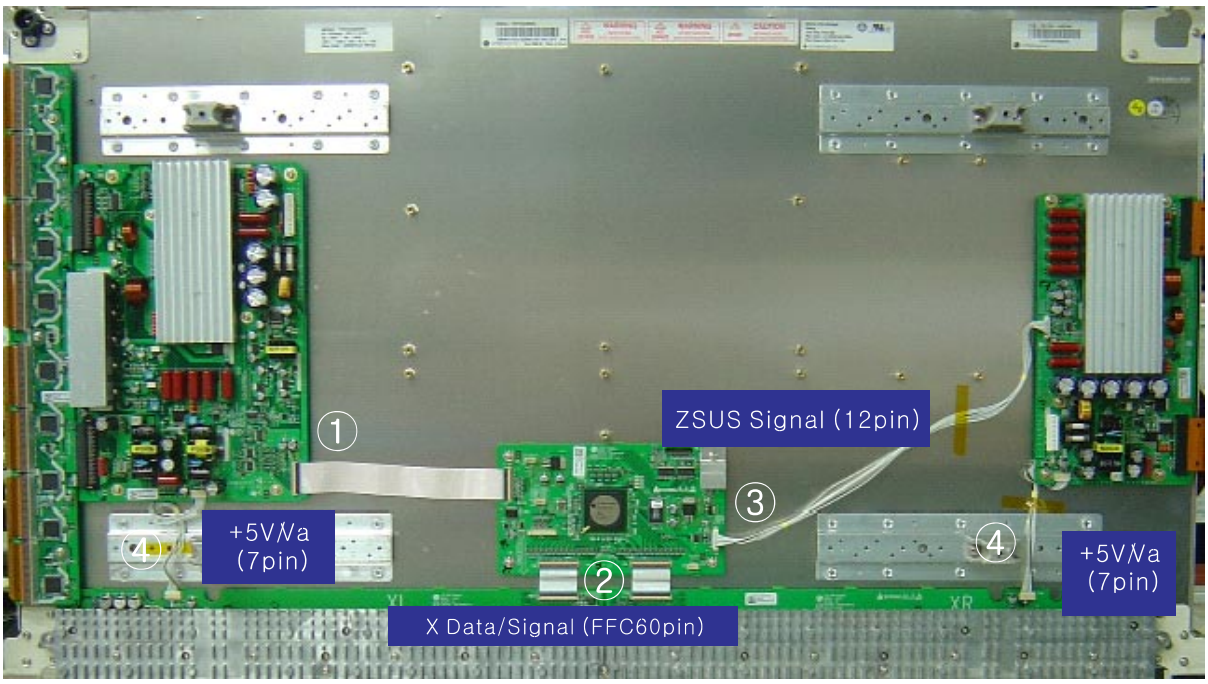
1. Formation of Module



No	Connector	Input Voltage & Signal
(1)	P1 [Y SUS B/D]	5V, Va, Vs
(2)	P152 [Y SUS B/D]	5V, Va
(3)	P1 [Z SUS B/D]	5V, Va, Vs
(4)	P7 [CTRL B/D]	5V
(5)	P4 [CTRL B/D]	Video Signal

No	Part No		Description
①	6871QCH077A	PWB(PCB) ASS'Y	CTRL B/D ASS'Y
②	6871QDH117A	PWB(PCB) ASS'Y	Y DRV B/D ASS'Y
③	6871QYH053A	PWB(PCB) ASS'Y	Y SUS B/D ASS'Y
④	6871QZH056A	PWB(PCB) ASS'Y	Z SUS B/D ASS'Y
⑤	6871QLH059A	PWB(PCB) ASS'Y	XL B/D ASS'Y
⑥	6871QRH068A	PWB(PCB) ASS'Y	XR B/D ASS'Y

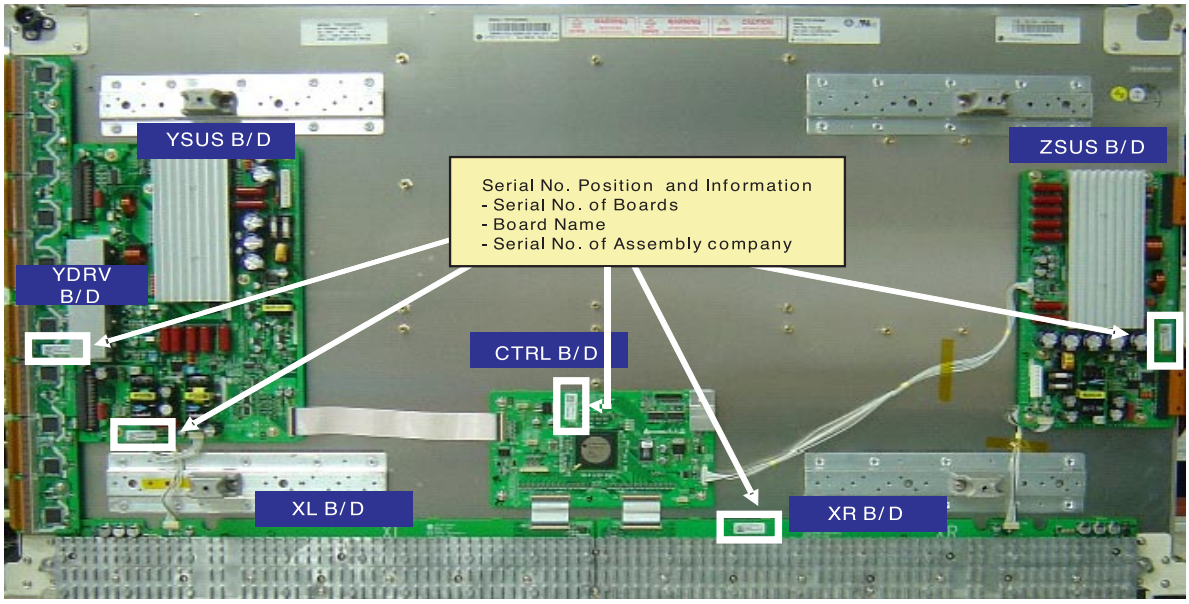
English



No	Part No.	EA	SPECIPICATION	Note
①	6850QV0006A	1EA	Y B/D<-->CTRL B/D P=0.5MM 50PIN L180MM AU PLATING	
②	6850QX0014P	1EA	X B/D <-->CTRL B/D P=0.5MM 60PIN L60MM AU	
③	6631Q12005N	1EA	1.25MM PITCH 12PIN L360MM UL1061-28AWG YEON-HO	
④	6631Q15003F	2EA	1.5MM PITCH 7PIN L150MM UL1061-26AWG YEON-HO	

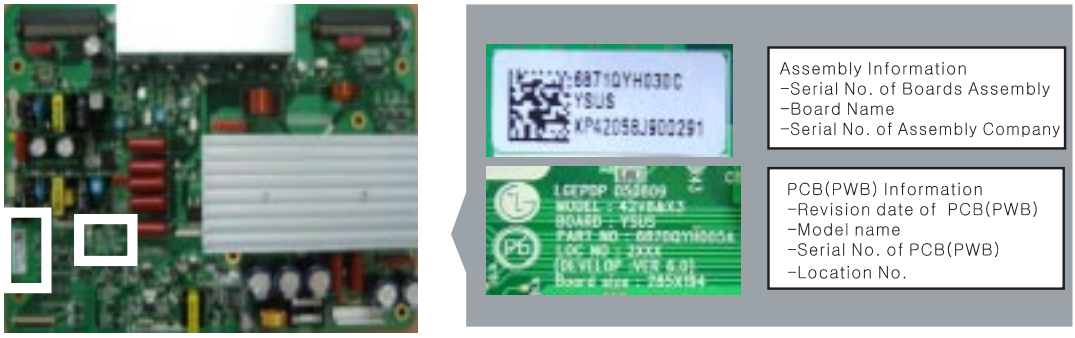
2. Information of Boards

1) 42X3 PDP Module



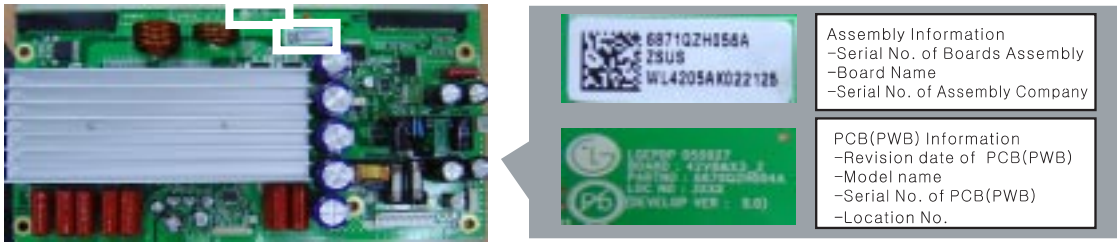
2) CTRL B/D

3) Y SUS B/D

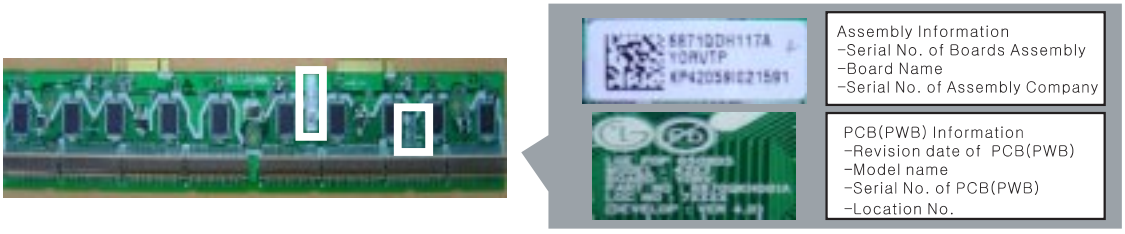


English

4) Z SUS B/D

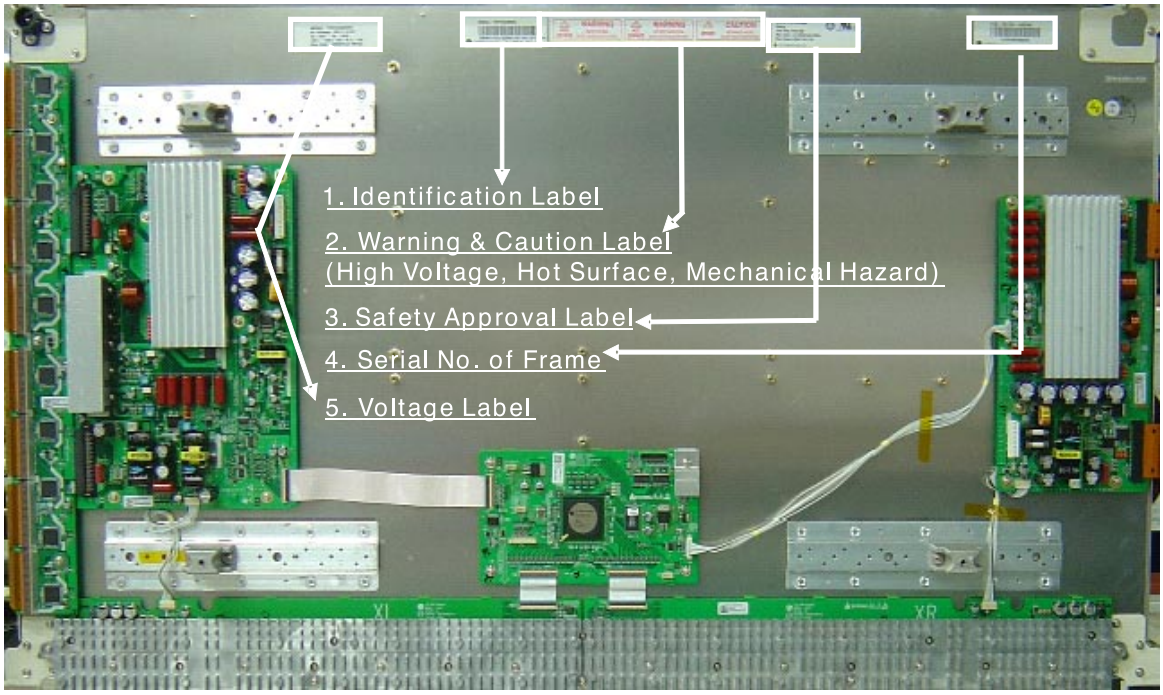


5) Y DRV B/D



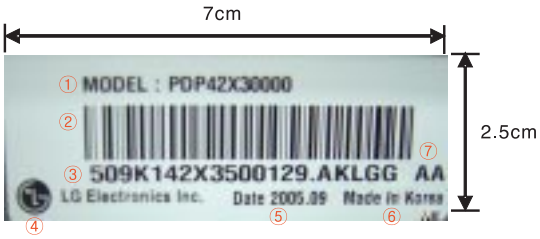
6) XL, XR B/D

3. Label Information of Module



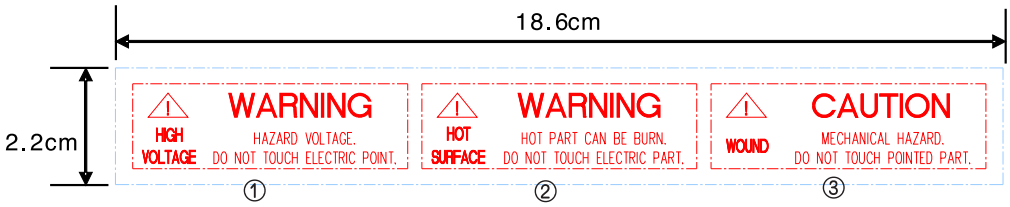
English

1) Identification Label



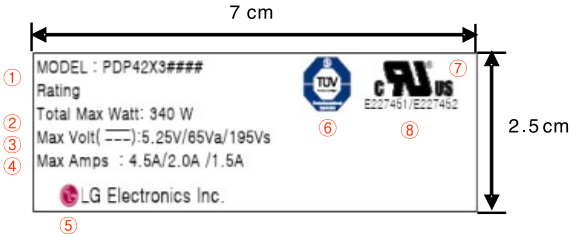
① Model Name
② Bar Code (Code 128, Contains the manufacture No.)
③ Manufacture No.
④ The trade name of LG Electronics
⑤ Manufactured date (Year & Month)
⑥ The place Origin
⑦ Model Suffix

2) Warning & Caution Label (High Voltage, Hot Surface, Mechanical Hazard)



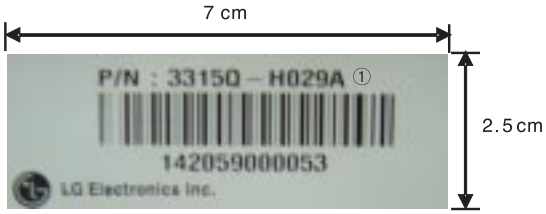
① Warning (High Voltage, Hazard Voltage)
② Warning (Hot Surface, Hot part can be burn)
③ Caution (Wound, Mechanical Hazard)

3) Safety Approval Label



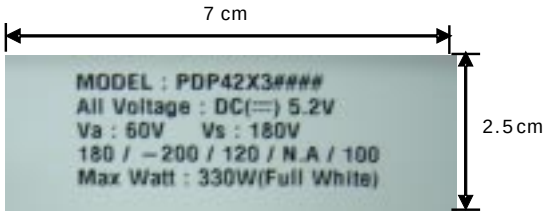
① Model Name
② Max. Watt (Full White)
③ Max. Volts
④ Max. Amps
⑤ The Trade Name of LG Electronics
⑥ TUV Approval Mark
⑦ UL Approval Mark
⑧ UL Approval No.

4) Serial No. of Frame



① Serial No. of Frame Ass'y

5) Voltage Label (Model Name & Operational Voltage)



Ⅳ. Adjustment

1. Application Object

This standard is applied to the PDP42X3#### PDP Module which is manufactured of PDP promotion department or elsewhere.

2. Notes

(1) Without any special specification, the Module should be at the condition of preliminaries more than 10minutes before adjusting.
① Service signal : 100% Full White signal
② Service DC voltage : Vcc : 5V, Va : 60V, Vs : 180V
③ DC/DC Pack voltage : Vsc : 120V, Vzb : 100V, -Vy : -200V
④ Preliminaries environment : Temp (25±5°C), Relative humidity (65±10%)

(2) Aging shall be performed of module in order for characteristics stabilization after completion of assembling adjustment. Conditions of aging are as follows.
① Service signal : 100% Full White, Red, Green, Blue pattern signal(Service time of each pattern : within 5minutes/cycle)
② Service DC voltage : Match the voltage with the set up voltage in the first adjustment.
③ Aging time : More than 4Hrs
④ Aging environment : Temp (25±2°C), Relative humidity- Less than 75%

(3) Module adjustment should be followed by below sequence.
① Initial voltage setting.(Vs : 180V, Va : 60V, Vcc : 5V)
② Vscan Voltage adjustment (120V)
③ -Vy Voltage adjustment (200V)
④ Y set_up Waveform adjustment.
⑤ Y set_down Waveform adjustment.
⑥ Vzb Voltage adjustment (100V)
But the above item may be altered by consideration of mass productivity.
(There shall be consultation and agreement of Research Office / Development Office / QA / Production Department in case when altering sequence order.)

(4) Without any special specification, you should adjust the Module in the environment of Temp (25±5°C) and Relative humidity (65±10%)

Caution) If you let the still image more than 10 minutes(especially The Digital pattern or Cross Hatch Pattern which has clear gradation), after image can be presented in the black level part of screen.

3. Adjustment after Assembling

3-1. Using Tools

Conditions of aging are as follows.
(1) Digital oscilloscope : More than 200MHz
(2) DVM(Digital Multimeter) : Fluke 187 or similar one
(3) Signal generator : VG-828 or similar one
(4) DC power supply
- DC power supply for Vs (1) : Should be changeable between 0V to 200V/ more than 10A
- DC power supply for Va (1) : Should be changeable between 0V to 100V/ more than 5A
- DC power supply for 5V (1) : Should be changeable between 0V to 10V/ more than 10A
- DC-DC Convertor Jig(1) : Vs, Va, 5V Jig with corresponding output to each voltage Pin arrangement of PDP42X3#### Module after the input of voltage.
- Voltage stability of power supply : Within ±1% for Vs/Va, within ±3% for 5V

3-2. Connection diagram of measuring instrument and setting up the initial voltage

(1) The Connection diagram
Refer to (Fig.1) Connection diagram of measuring instrument.
(2) Setting up the initial voltage : Refer to Voltage Label
Vcc : 5V, Va : 60V, Vs : 180V
But, Initially setting up voltage can be changed by the set up range according to the Module's characteristic.

3-3. How to Adjust

1. Connect the measuring instrument to be (Fig.1).

2. How to adjust Y SUS(Adjustment should be done after setting Vs/Va to the set voltage)

(1) -Vy Voltage adjustment
① Measure and adjust the voltage between -Vy TP on top of the DD_pack on theY SUS B/D .
② Turn the variable resistor of -Vy DD_pack(PS101) on Y SUS B/D to set to (-200 ±0.5V).

(2) Vscan Voltage adjustment
① Measure and adjust the voltage between Vsc TP on right of the P4 on the Y SUS B/D .
② Turn the variable resistor of Vscan DD_pack(PS102) on Y SUS B/D to set to (120 ±0.5V).

(3) Connect the oscilloscope probe Waveform point on Y DRV B/D and the GND.

English

(4) Y set-up voltage waveform adjustment.

①Turn the VR3 on Y SUS B/D so that Vsp voltage A of (Fig. 2) be 150 ±1V.

(5) Y set-down voltage waveform adjustment.

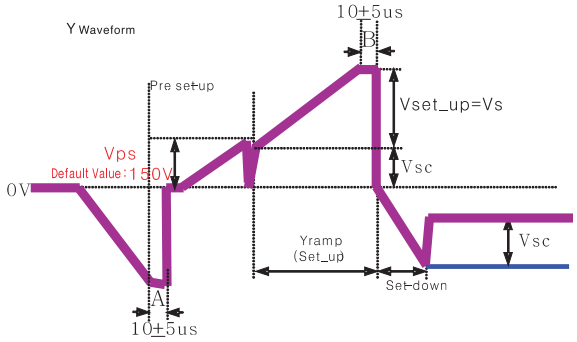
①Turn the VR2(Set _dn_Vy)on Y SUS B/D so that waveform A of (Fig. 2) be 10 ±5μs.

3. How to adjust Z SUS (Adjustment should be done after setting Vs/Va to the set voltage)

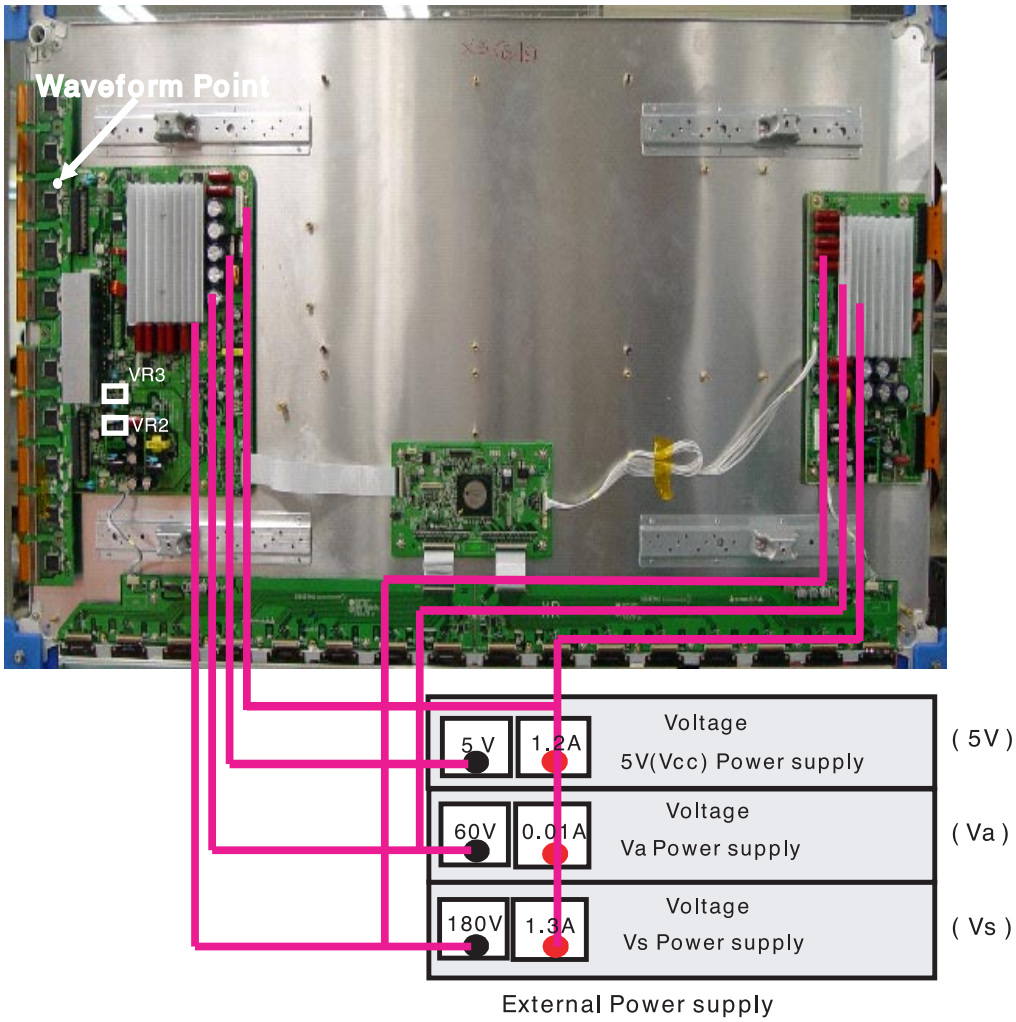
(1) Vzb(Z bias) voltage adjustment.

①For the Vzb voltage, measure and adjust the voltage between the frame GND and Vzbias point(Q18 Drain) in left side on Z SUS B/D.

②Turn the variable resistor of Vzb DD_Pack(PS101) on Z SUS B/D to set to 100 ±0.5V.



(Fig. 2) Y set-up Waveform



<Caution>

(1) The power of the signal generator should be turned on before turning on the power of DC power supply.
(2) The voltage of DC power supply, in standard of Module input voltage, should be preset as below. (Vs dc : 180V, Va dc : 60V, 5V dc :5V)
(3) The power of power supply must turned ON/OFF by this sequence.
* Module on : 5V →Va →Vs, * Module off : Vs →Va →5V
(4) Signal generator should be selected with 1024 x 768 mode.

(Fig. 1) Connection diagram of measuring instrument

English

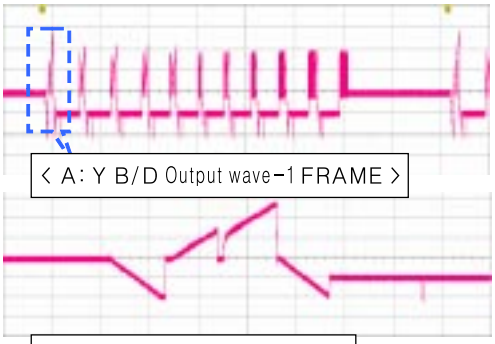
Ⅴ. Trouble Shooting

1. Checking for No Picture

A screen doesn't display at all and condition of black pattern or power off.

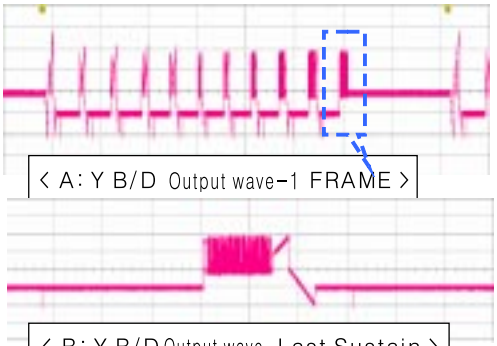
(1) Check whether the CTRL B/D LED(D12, D13, D14) is turned on or not.
(2) Check the power and signal cable of CTRL B/D.
(3) X B/D, Y B/D, Z B/D is well plugged in.
(4) Check the connection of X B/D, Y B/D and Z B/D to CTRL B/D.
(5) Measure the output wave of X, Y, Z B/D with oscilloscope(more than 200MHz) and find the trouble of B/D by comparing the output wave with below figure.
- Measure Point fo Y B/D : TP(Waveform on Y DRV B/D)
- Measure Point fo Z B/D : TP(Bead B28)

(6) Check the SCAN(Y side) IC
(7) Check the DATA(X side) TCP IC
(8) Replace the CTRL B/D.



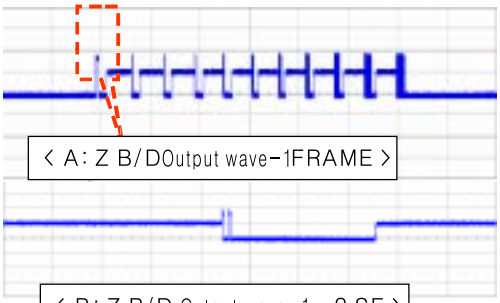
< A: Y B/D Output wave-1 FRAME >

< B: Y B/D Output wave-1 SF >



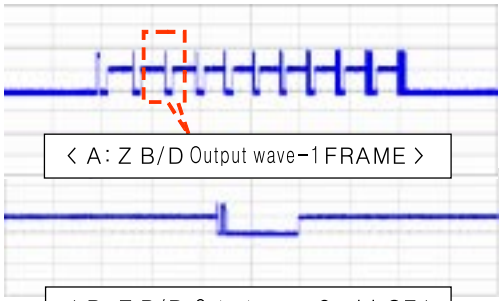
< A: Y B/D Output wave-1 FRAME >

< B: Y B/D Output wave-Last Sustain >



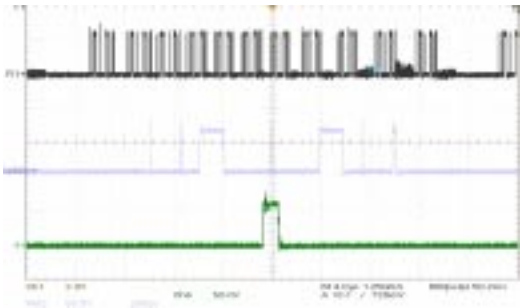
< A: Z B/D Output wave-1FRAME >

< B: Z B/D Output wave-1~2 SF >



< A: Z B/D Output wave-1 FRAME >

< B: Z B/D Output wave-3~11 SF >



< X B/D Output wave-1 FRAME >

< X B/D Output wave-1 SF >

< X B/D Output wave-Extension >

2. Hitch Diagnosis Following Display Condition

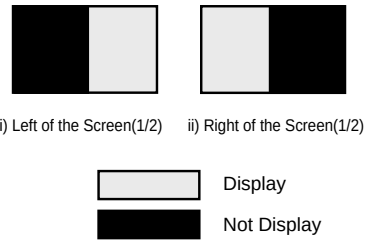
2-1. 1/2 of the screen doesn't be shown

(1) Check the power connector of X B/D, corresponding to the screen failure part.
(2) Check the connector between CTRL B/D and X B/D, corresponding to the screen failure part.
(3) Replace the corresponding X B/D. For X B/D replacement, check the TCP is correctly connected .

※ Relationship between screen and X B/D

Screen		X B/D
Left of the Screen 1/2	↔	Right X B/D
Right of the Screen 1/2	↔	Left X B/D

※ Screen Display Form



2-2. 1/4 of the screen doesn't be shown

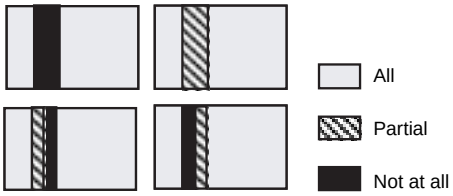
Identical to 2-1

2-3. Screen doesn't be shown as Data TCP(Include not be shown part of Data TCP quantity or a part)

(1) If there is no change after replacement of cable between CTRL B/D and X B/D, replace CTRL B/D.
(2) Check Data TCP failures, corresponding part to screen failure, and if no defects, connect the corresponding TCP again.
(3) If the corresponding Data TCP fails, Module should be replaced.

※ Screen display form

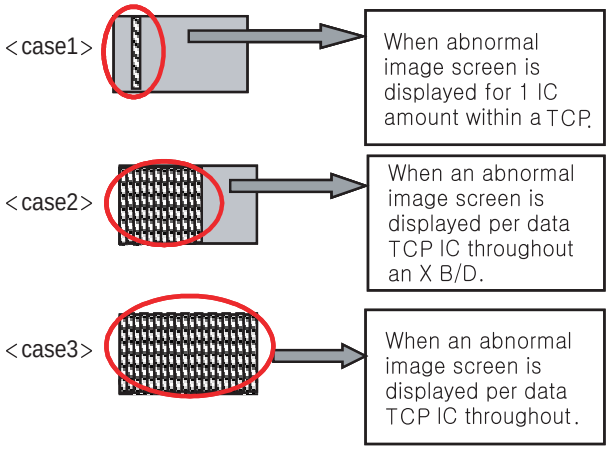
(Anything of the 16 Data TCP can be shown beside below pictures)



2-4. It is generated Unusual Pattern of Data TCP IC unit

(1) If it happens as line shape or dot shape, screw the X B/D again, and if no change, replace the X B/D.
(2) In case of <case 1>
- Check the connection of Data TCP connector
- Replace the corresponding X B/D or CTRL B/D.
(3) In case of <case 2>, <case 3>
- Check connector connecting the CTRL B/D to relevant X B/D.
- Replace the relevant X B/D or CTRL B/D.

※ Screen Display Form



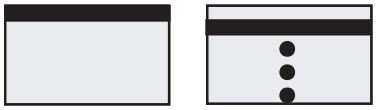
※ After separating TCP HEAT SINK, replace Silicon tape when the TCP IC marks in Silicon tape of H/S feel hard.(silicon tape, 7250SC0010A, TP-2460 DOW CORNING 8.0MM T0.75 NON GRAY (L 218.4) THERMAL PAD FOR 42X3 H/S)

English

2-5. Screen doesn't be shown at all as Scan FPC.

(1) It's may be a problem between Scan FPC and Y DRV B/D.
(2) Check the connection of Y DRV B/D and Scan FPC.
(3) If the Scan IC is failed, replace the Y DRV B/D.

※ Screen Display Form

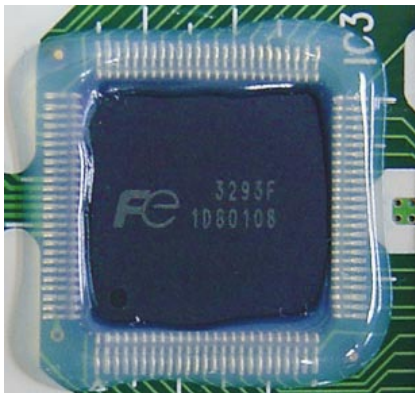


one ten of screen

The screen display is very good

The screen display is poor

※ Check a method of SCAN IC

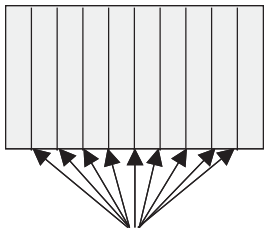


Change the Vpp Pin into ANODE and GND Pin into CATHOD and then test the Diode with forward or reverse direction.

2-6. Regular stripe is generated at regular internal on the whole screen. (A vertical stripe flash at especial color)

(1) This is a problem about CTRL B/D.
(2) Replace the CTRL B/D.

※ Screen Display Form



The screen has a vertical line with regular gap

2-7. Data copy is generated to stripe direction.

(1) In this case, it's due to incorrect marking of scan wave.
(2) Replace the Y DRV B/D or Y B/D.

※ Screen Display Form

<Display Pattern>

<Case 1 : Entire Copy>

<Case 2 : Top Copy>

<Case 3 : Bottom Copy>

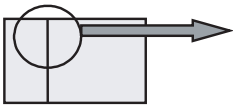
<Case 2 : Entire Copy>

2-8. The screen has one several vertical line.

(1) In this case, It isn't a problem about CTRL B/D or X B/D.
(2) It may cause followings.
- It's out of order a panel
- Open or short of DATA TCP attached panel
- It's out of order a DATA TCP IC attached panel

(3) Replace Module.

※ Screen Display Form



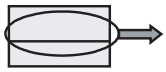
It may show several vertical lines in a quarter or other division part of screen including left case.

2-9. The screen has one or several horizontal line.

(1) In this case, it isn't a problem about CTRL B/D or Y B/D.
(2) It may cause followings.
- It's out of order a panel
- Open or short of SCAN FPC attached panel
- It's out of order a SCAN IC attached panel

(3) Replace Module.

※ Screen Display Form



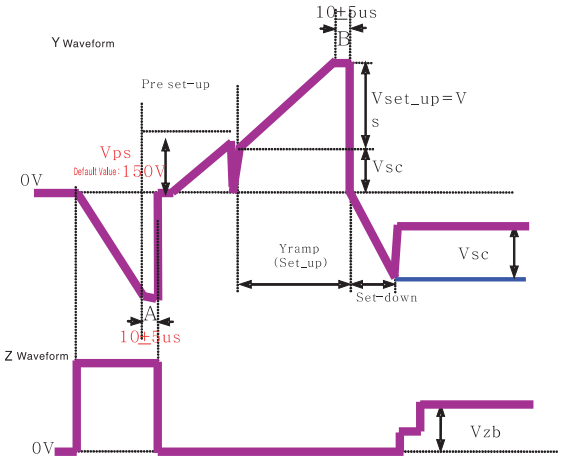
It may show several horizontal lines including left case.

2-10. Lightness of screen is wholly darken though there is input-signal-pattern

(1) In this case, Z B/D operation isn't complete.
(2) Check the power cord of Z B/D.
(3) Check the connector of Z B/D and CTRL B/D.
(4) Replace the CTRL B/D or Z B/D.

2-11. The screen displays other color partially on full white screen or happens Mis-discharge partially on full black screen.

(1) Check the declination of Y B/D set up, set down wave.
(2) Measure each output wave with oscilloscope(more than 200MHz) and compare the data with below figure data. The slope of set_up in B/D is VR3, The slope of set_down is VR2, The voltage of -Vy and Vscan is respectively PS101 and PS 102. for these, Vzd of Z B/D adjust as indicated in Label by making Z B/D of Waveform variable.
- Measuring Point of Y B/D : Waveform on Y DRV B/D
- Measuring Point of Z B/D : B28



※ The set value of above A and B can be adjusted with in the variable range considering the mass production capability because it is a Typ. Value.

2-12. It doesn't display a specified brightness at specified color

(1) Check the connector of CTRL B/D input signal.
(2) Replace the CTRL B/D.

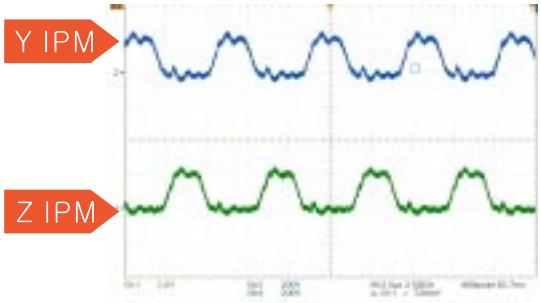
English

3. Checking for Component Damage

3-1. Y IPM(IC18) or Z IPM(IC2) Damage

(1) When the internal Sustain FET or ER FET of Y B/D IPM(IC18) or Z B/D IPM(IC2) is damaged, screen doesn't be shown or Mis - discharge of partial screen is generated.

- Test Point : Enlarge after measuring
  GND ~ Waveform(Y DRV B/D),
  GND ~ B28(Z B/D).
- Wave format : Y DRV B/D in Waveform or B28(Z B/D) has no output wave.

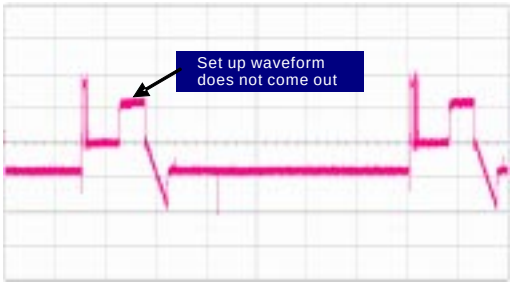


<Fig. 1 IPM Normal Output Wave>

3-2. FET Ass'y(Y B/D : HS2) Damage

(1) When Set_Up FET(2nd FFT of HS2) is damaged, screen doesn't be shown.

- Test Point : Enlarge after measuring
  GND ~ Waveform(Y DRV B/D)
- Wave format : As shown fig. 2



<Fig. 2 When the Set_Up FET is damaged>

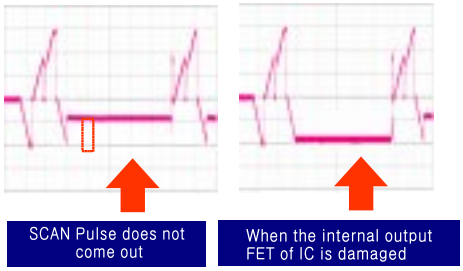
(2) When Set_Down FET/Pass_Top FET(1st, 3rd, 4th, 5th FFT of HS2) is damaged, Mis - discharge of entire screen is generated.

- Test Point : Enlarge after measuring
  GND ~ Waveform(Y DRV B/D)
- Wave format : As shown fig. 3

<Fig. 3 When the Set_Down FET is damaged>

3-3. SCAN IC(Y DRV B/D : IC1~10) Damage

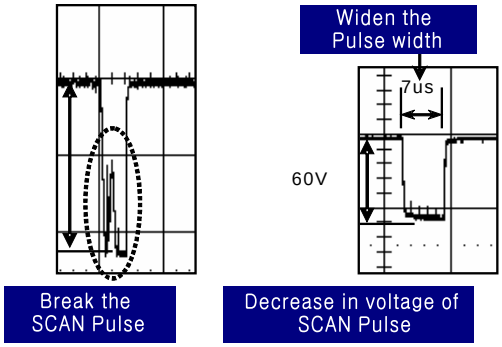
(1) In case of SCAN IC poor, one horizontal line may open at screen.
- Test Point: Enlarge after measuring
  GND ~ Output ICT on Y DRV B/D
- Wave format : As shown fig. 4



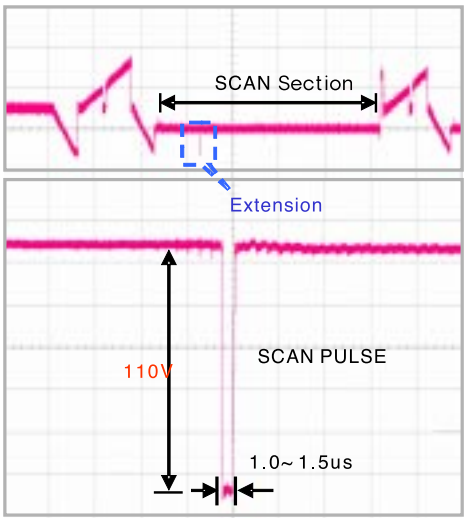
<Fig. 4 When SCAN IC is poor>

(2) Screen may not shown when SCAN IC is damaged by SCAN IC poor, external electricity or spark.
- Test Point : Enlarge after measuring
  GND ~ Output ICT on Y DRV B/D
- Wave format : Output wave format isn't output
  (You can see the damage for Y DRV B/D's SCAN IC)

(3) In case of shorting the SCAN IC output by a dust, foreign substance, it may overlap two horizontal lines on screen.
- Test Point : Enlarge after measuring
  GND ~ Output ICT on Y DRV B/D
- Wave format : As shown fig. 5



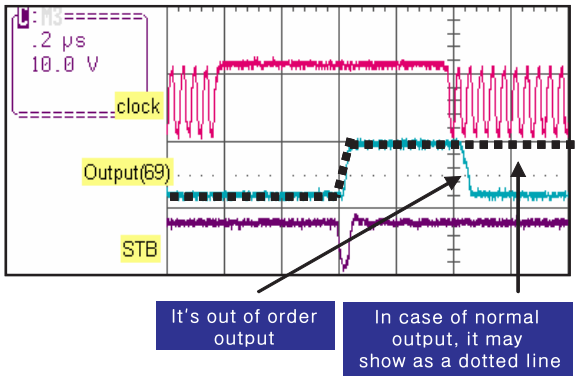
<Fig. 5 When SCAN IC output is short>



<Fig. 6 SCAN IC Normal Output Wave >

3-4. TCP Damage

(1) In case of shorting or opening the IC output of TCP, it may show one or several vertical lines.
- Test Point : Enlarge after measuring
  Output TP of GND ~ TCP
- Wave format : As shown output fig. 7
  In case of normal wave output, when STB signal is generated, maintain High output. And when STB signal is generated again must be fall Low.
  But when IC of TCP is poor, STB signal is not generated Output falls with Low.



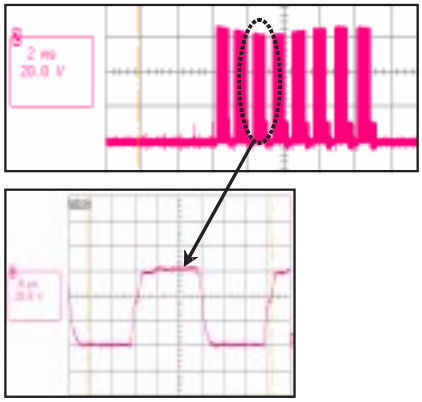
<Fig. 7 When IC output of COF is poor>

※ Remove SR before measuring because the output TP of TCP is covered with SR. Insulate again with insulating tape after measuring.

English

(2) In case of IC damage, corresponding IC inside of TCP, pictures by IC unit inside of TCP will not appear or Mis - discharge. In most cases, the burnt mark can be seen when IC failure occurs.

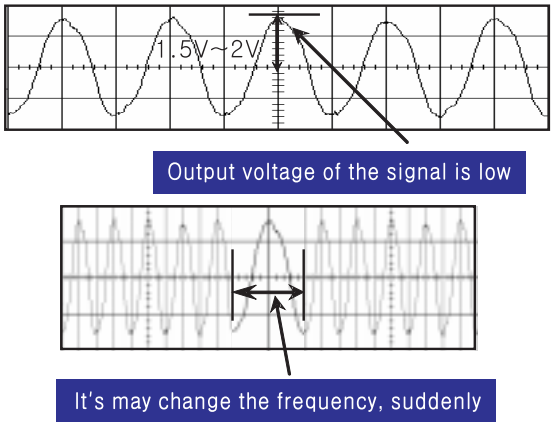
- Test Point : Enlarge after measuring output of GND ~ TCP
- Wave format : Output wave doesn't come out



<Fig. 8 TCP Normal Output Wave >

(2) In case of unusual launch of the Crystal, it may blink the screen.

- Test Point : Enlarge after Measuring
  3pin of GND ~ Crystal(CTRL B/D: X1)
- Wave format : As shown fig. 10

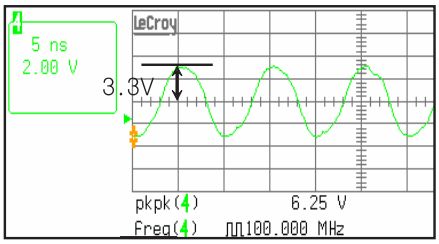


<Fig. 10 When Crystal is poor>

3-5. Crystal(CTRL B/D : X1) Damage

(1) When Crystal is damage, the screen doesn't be shown.

- Test Point : Enlarge after Measuring
  3pin of GND ~ Crystal(CTRL B/D: X1)
- Wave format : Output wave doesn't come out



<Fig. 9 Crystal Normal Output Wave >

Ⅵ. Critical Components List

(1) The critical components list of PDP42X3#### Model is as below.

(2) A component of Ⓢ mark is important to keep product's security. Therefore in exchanging a component, appointed component is necessary used.

(3) Ⓢ is an abbreviated word which is instead of <Safety>mark.

	C27, C28, 31, 34, 36	C54, 63	C143
Y Sus B/D	250v 150μF Samwha	350v 33μF Samwha	250v 47μF Samwha
IC101	Ⓢ FS1	Ⓢ Fuse holder(FS2, 3)	Ⓢ FS2, 3
NATIONAL LM2585S	10A, 125V	Triad 10A, 300V	T4.0AH, 250V
Ⓢ FL1	Ⓢ L1	Ⓢ L2	Ⓢ IC18
·GET Plus 60uH 6200JB8011J	·GET Plus 0.3uH D0019A	·GET Plus 0.75uH D0020A	Heatsink(IPM) 150*62*19.5(mm)
Ⓢ HS2	Ⓢ T101	Ⓢ PS101	Ⓢ T20 on PS101(DD9A)
Heat Sink 111*30*25 (mm)	·GET Plus 6170Q – W007A, 15uH	·LG Innotek YPCD-J009A	·SamWha Tecom. 0047X-F, 1mH ·DONG HEUNG ELECTRONICS LID22-543A, 1mH
Ⓢ PS102	Ⓢ T20 on PS102(DD3D)	Ⓢ T20 on PS102(DD3G)	Ⓢ P20 on PS101, PS102
·LG Innotek YPCD-J003D YPCD-J003G	·SamWha Tecom. 0047W-F, 940uH	·SamWha Tecom. 0047Y-F, 940uH ·DONG HEUNG ELECTRONICS LID22-544A, 940uH	Optical Isolator ·Auk Corp. SPC717M ·NEC LTD PS2701 or PS2701-1 ·LITE-ON Technology Corp. LTV-357T
Ⓢ C8, 9, 10, 16, 37, 41, 42	C4	C51, 55	
MPE 335K2E ·SUNG HO ELECTRONCS CORP. MPE 250V 3.3uF	Ⓢ 105K 400 ·SUNG HO ELECTRONCS CORP. MPE 400V 1.0uF	M105K 250F ·Matsushita Electric Ind. ECQE 250V 1.0uF	
	C7, 10, 11, 12, 13	C29, 30	Ⓢ FS3
Z Sus B/D	250v 150μF Samwha	160v 68μF Samwha	10A, 125V
Ⓢ Fuse holder(FS1, 2)	Ⓢ FS1, 2	Ⓢ FL1	FL2
Triad 10A, 300V	T4.0AH, 250V	·GET Plus 6200JB8011J	NIGATA STC682D

English

L1	L2	IC2	P20 on PS101, PS102
·GET Plus 0.3uH D0019A	·GET Plus 0.75uH D0020A	Heatsink(IPM) 150*62*19.5(mm)	Optical Isolator ·Auk Corp. SPC717M ·NEC LTD PS2701 or PS2701-1 ·LITE-ON Technology Corp. LTV-357T
PS101	**T20 on PS101(DD3D)**	**T20 on PS101(DD3G)**	
·LG Innotek YPCD-J003D YPCD-J003G	·SamWha Tecom. 0047W-F, 940uH	·SamWha Tecom. 0047Y-F, 940uH ·DONG HEUNG ELECTRONICS LID22-544A, 940uH	
C111	**C1,2,3,4,5,6,9**		**42"Glass**
M105K 2 5 0 F ·Matsushita Electric Ind. ECQE 250V 1.0uF	MPE 335K2E ·SUNG HO ELECTRONCS CORP. MPE 250V 3.3uF	Panel	Asahi glass Front : 978*550*2.8(mm) Back : 958*570*2.8(mm)
42"Frame	**Film Filter(Option)**	**FPC**	
1005*597 (mm)	·LG Chem. ·SKC Co.Ltd. ·Mitsui Chem.	flammability : 94V-0 ·YoungPoong : **YO`serise** ·Daeduck GDS : **F1-0** ·ACT Co.,Ltd.: A1, A2, A3 ·Yeu Hwan Technology Co., Ltd.: D1, M1, N1, T1, mm4, mm5	
	Thermal Pad	**TCP**	**TCP Heat Sink**
X B/D	·Dow Corning **TP 2460**	·UBE Industries **(C)S(I)** Flammability : VTM-0	·454*70*24 (2EA) ·454*62*24 (2EA)

Ⅶ. Records of Revision for Boards, components and ROM DATA

1. Boards

No.	Date	Board	Part Number	Note
1	2005.09.27	CTRL B/D ASSY(LVDS)	6871QCH077A	Initial Product
2	2005.09.27	Y DRV B/D ASSY	6871QDH117A	Initial Product
3	2005.09.27	Y SUS B/D ASSY	6871QYH053A	Initial Product
4	2005.09.28	Z SUS B/D ASSY	6871QZH056A	Initial Product
5	2005.09.28	X LEFT B/D ASSY	6871QLH059A	Initial Product
6	2005.09.28	X RIGHT B/D ASSY	6871QRH068A	Initial Product

English

2. COMPONENTS

No.	Date	Board	Part Number	Note
1	2005.10.01	Y SUS IPM(IC18)	4921QP1041A	Initial Product
2	2005.10.01	Z SUS IPM(IC2)	4921QP1041A	Initial Product
3	2005.10.01	Pass TOP/Reset heat-sink Ass' y	4921QF5005A	Initial Product
4	2005.10.01	DDPACK (PS101)	6871QEH029A	Initial Product
5	2005.10.01	DDPACK (PS102)	6871QEH023G	Initial Product
6	2005.10.01	MCM LGPCMx05A	6001QV0007A	Initial Product
7	2005.10.01	CRYSTAL(X1)	6212AB4610A	Initial Product
8	2005.10.01	TCP	0ILNR00150A	Initial Product
9	2005.10.01	80ch scan IC	0ILMRFE001C	Initial Product
10	2005.10.01	98PIN CONNECTORYSUS IPM(IC18)	6630X60132A	Initial Product

3. ROM DATA

No.	Date	ROM Data Version	Contents

English

2. PDP50X3#### Module

CONTENTS

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Ⅱ. Technical Feature
Ⅲ. Formation and Specification of Module
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3. Label information of Module
Ⅳ. Adjustment
Ⅴ. Trouble Shooting
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2. Hitch Diagnosis Following Display Condition
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2-2. 1/4 of the screen doesn't be shown
2-3. Screen doesn't be shown as Data TCP
2-4. It is generated unusual pattern of Data TCP IC unit
2-5. Screen doesn't be shown at all as Scan FPC
2-6. Regular stripe is generated at regular internal on the whole screen
2-7. Data copy is generated to stripe direction
2-8. The screen has one several vertical line
2-9. The screen has one or several horizontal line
2-10. Lightness of screen is wholly darken though there is input-signal-pattern
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4-1. Scan IC follows in application, compatibility of Y DRV Top, Bottom B/D
Ⅵ. Safety Components List
Ⅶ. Records of Revision for Boards, Components and ROM DATA
* Annexing : Schematic Diagram

Ⅰ. Safety Precautions

When servicing of PDP Module, it should be not enforced into another way aside next rule, or a unaccustomed person should not repairing.
When using/handling this PDP Module, pay attention to the below warning and cautions.

⚠ Warning

Indicates a hazard that may lead to death or injury if the warning is ignored and the product is handled incorrectly.

⚠ Caution

Indicates a hazard that can lead to injury or damage to property if the caution is ignored and the product is handled incorrectly.

1) WARNING

(1) Do not touch Signal and Power Connector while this product operates.

(2) Do not supply a voltage higher than that specified to this product. This may damage the product and may cause a fire.

(3) Do not use this product in locations where the humidity is extremely high, where it may be splashed with water, or where flammable materials surround it.
Do not install or use the product in a location that does no satisfy the specified environmental conditions. This may damage the product and may cause a fire.

(4) If a foreign substance (such as water, metal, or liquid) gets inside the product, immediately turn off the power.
Continuing to use the product, it is may cause fire or electric shock.

(5) If the product emits smoke, and abnormal smell, or makes an abnormal sound, immediately turn off the power.
Continuing to use the product, it may cause fire or electric shock.

(6) Do not disconnect or connect the connector while power to the product is on. It takes some time for the voltage to drop to a sufficiently low level after the power has been turned off.
Confirm that the voltage has dropped to a safe level before disconnecting or connecting the connector.

(7) Do not pull out or insert the power cable from/to an outlet with wet hands. It may cause electric shock.

(8) Do not damage or modify the power cable. It may cause fire or electric shock.

(9) If the power cable is damaged, or if the connector is loose, do not use the product : otherwise, this can lead to fire or electric shock.

(10) If the power connector or the connector of the power cable becomes dirty or dusty, wipe it with a dry cloth. Otherwise, this can lead to fire.

(11) PDP Module uses a high voltage (Max.450V dc). Keep the cautions concerning electric shock and do not touch the Device circuitry when handling the PDP Unit. And because the capacitor of the Device circuitry may remain charged at the moment of Power OFF, standing by for 1 minute is required in order to touch the Device circuitry.

2) CAUTIONS

(1) Do not place this product in a location that is subject to heavy vibration, or on an unstable surface such as an inclined surface. The product may fall off or fall over, causing injuries.

(2) Before disconnecting cable from the product, be sure to turn off the power. Be sure to hold the connector when disconnecting cables. Pulling a cable with excessive force may cause the core of the cable to be exposed or break the cable, and this can lead to fire or electric shock.

(3) This product should be moved by two or more persons. If one person attempts to carry this product alone, he/she may be injured.

(4) This product contains glass. The glass may break, causing injuries, if shock, vibration, heat, or distortion is applied to the product.

(5) The temperature of the glass of the display may rise to 80°C or more depending on the conditions of use.
If you touch the glass inadvertently, you may be burned.

(6) If glass surface of the display breaks or is scratched, do not touch the broken pieces or the scratches with bare hands. You may be injured.

(7) PDP Module requires to be handled with care not to be touched with metal or hard materials, and must not be stressed by heat or mechanical impact.

(8) There are some exposed components on the rear panel of this product. Touching these components may cause an electric shock.

(9) When moving the product, be sure to turn off the power and disconnect all the cables. While moving the product, watch your step. The product may be dropped or all, leading to injuries of electric shock.

English

(10) In order to protect static electricity due to C-MOS circuitry of the Drive part, wear a wrist band to protect static electricity when handling.

(11) If cleaning the Panel, wipe it with a soft cloth moistened with water or a neutral detergent and squeezed, being careful not to touch the connector part of the Panel. And don't use chemical materials like thinner or benzene.

(12) If this product is used as a display board to display a static image, "image sticking" occurs. This means that the luminance of areas of the display that remain lit for a long time drops compared with luminance of areas that are lit for a shorter time, causing uneven luminance across the display.
The degree to which this occurs is in proportion to the luminance at which the display is used. To prevent this phenomenon, therefore, avoid static images as much as possible and design your system so that it is used at a low luminance, by reducing signal level difference between bright area and less bright area through signal processing.

(13) Because PDP Module emits heat from the Glass Panel part and the Drive circuitry, the environmental temperature must not be over 40°C.
The temperature of the Glass Panel part is especially high owing to heat from internal Drive circuitry. And because the PDP Module is driven by high voltage, it must avoid conductive materials.

(14) If inserting components or circuit board in order to repair, be sure to fix a lead line to the connector before soldering.

(15) If inserting high-power resistor(metal-oxide film resistor or metal film resistor) in order to repair, insert it as 10mm away as from a board.

(16) During repairs, high voltage or high temperature components must be put away from a lead line.

(17) This is a Cold Chassis but you had better use a cold transformer for safety during repairs. If repairing electricity source part, you must use the cold transformer.

(18) Do not place an object on the glass surface of the display. The glass may break or be scratched.

(19) This product may be damaged if it is subject to excessive stresses (such as excessive voltage, current, or temperature). The absolute maximum ratings specify the limits of these stresses.

(20) The recommended operating conditions are conditions in which the normal operation of this product is guaranteed. All the rated values of the electrical specifications are guaranteed within these conditions.
Always use the product within the range of the recommended operating conditions. Otherwise, the reliability of the product may be degraded.

(21) This product has a glass display surface. Design your system so that excessive shock and load are not applied to the glass. Exercise care that the vent at the corner of the glass panel is not damaged.
If the glass panel or vent is damaged, the product is inoperable.

(22) Do not cover or wrap the product with a cloth or other covering while power is supplied to the product.

(23) Before turning on power to the product, check the wiring of the product and confirm that the supply voltage is within the rated voltage range. If the wiring is wrong or if a voltage outside the rated range is applied, the product may malfunction or be damaged.

(24) Do not store this product in a location where temperature and humidity are high. This may cause the product to malfunction. Because this product uses a discharge phenomenon, it may take time to light (operation may be delayed) when the product is used after it has been stored for a long time. In this case, it is recommended to light all cells for about 2 hours (aging).

(25) This product is made from various materials such as glass, metal, and plastic. When discarding it, be sure to contact a professional waste disposal operator.

(26) If faults occur due to arbitrary modification or disassembly, LG Electronics is not responsible for function, quality or other items.

(27) Use of the product with a combination of parameters, conditions, or logic not specified in the specifications of this product is not guaranteed. If intending to use the product in such a way, be sure to consult LGE in advance.

(28) Within the warranty period, general faults that occur due to defects in components such as ICs will be rectified by LGE without charge. However, IMAGE STICKING due to misapplying the above (12) provision is not included in the warranty. Repairs due to the other faults may be charged for depending on responsibility for the faults.

3. Warning label for PDP Module

1) PCB Warning label

(1)Warning

Warning against any dangers under certain circumstance.

(2)Hot surface

Warning against any possibilities of injury or burn due to high temperature under certain circumstance.

(3)Dangerous voltage

Warning against the possibility of electric shock under certain circumstance.

(4)Electrostatic sensitive devices

Warning against any possibilities of electric shock/high temperature by touching under certain circumstance

(5)Caution sentence

Careful touching before inspection.

(6) Fuse Caution sentence

CAUTION

FOR CONTINUED PROTECTION AGAINST RISK OF FIRE,

REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE(S).

The fuse should be replaced with the same type and rating to prevent fire under certain circumstance

2) Safety precautions on Module

(1)High Voltage

Warning against the danger of electric shock when touching due to dangerous high voltage.

(2)Hot Surface

Warning against the danger of burn when touching due to high temperature parts.

(3)Wound

Caution against the danger of mechanical injuries.

English

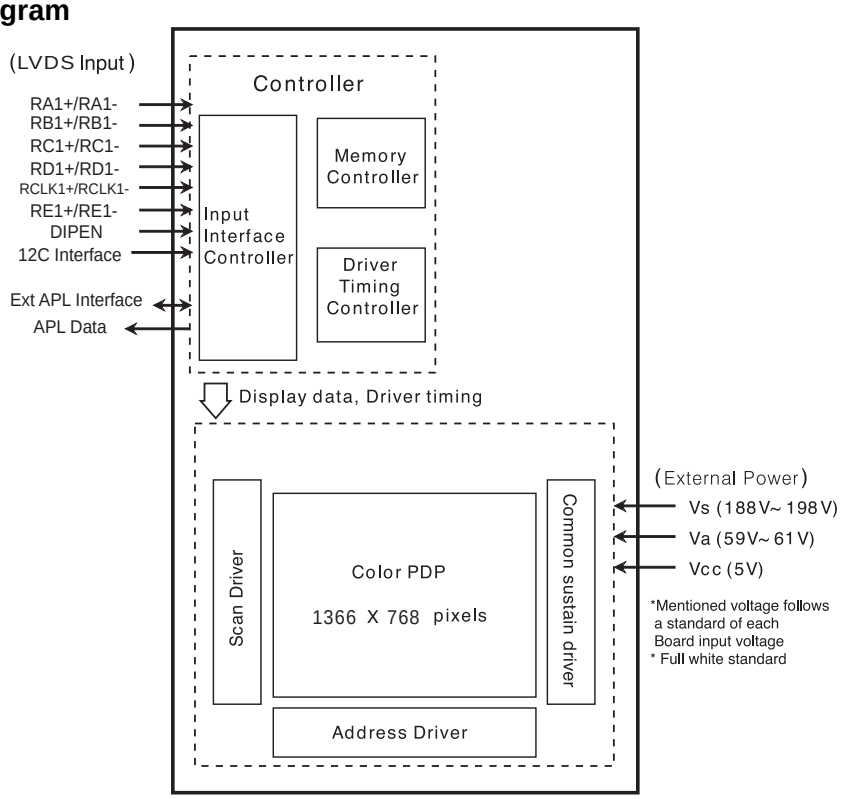
Ⅱ. Technical Feature

PDP Module is a display device to be divided into a Panel part and a Drive part. The Panel part consists of Electrodes, Phosphor, various dielectrics and gas, and the Drive part includes electronic circuitry and PCB.
PDP50X3#### model produced in the LG electronics is 50inches color Plasma display module of Wide XGA(1366(H) x 768(V)), and it is a display device giving concrete to bright image by using AC Plasma technology of LG electronics.

1) General Specification

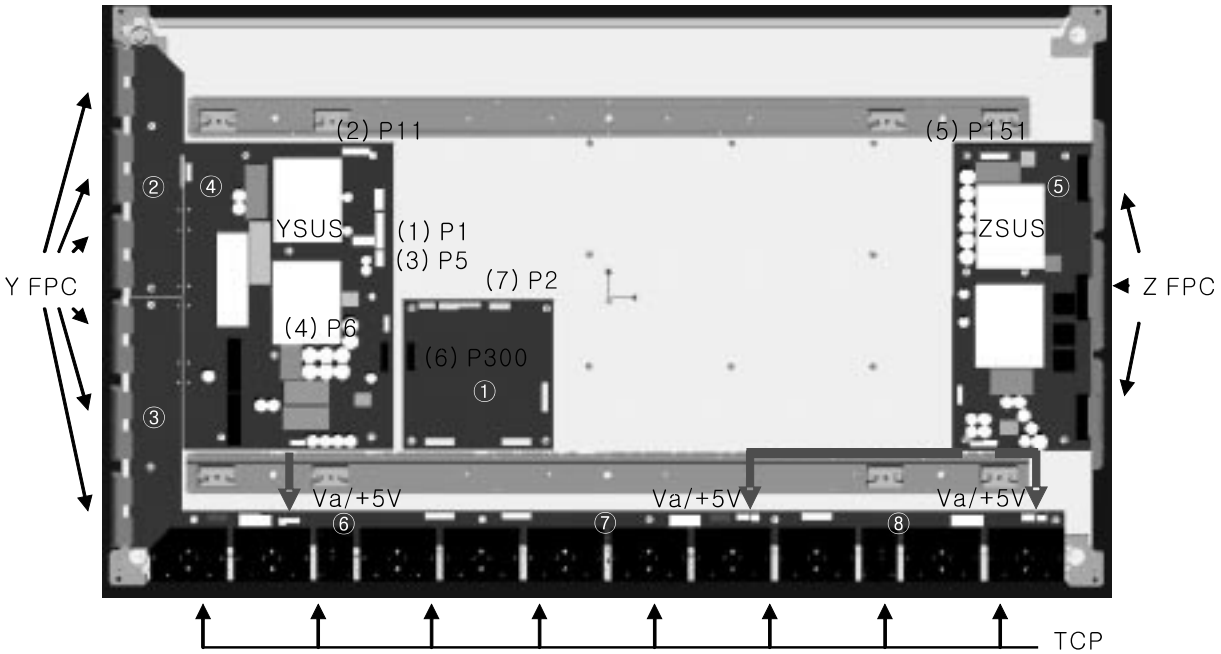
(1) Model Name	:	PDP50X3####
(2) Number of Pixel	:	1366(H) × 768(V) (1pixel=3 RGB cells)
(3) Pixel Pitch	:	810㎛(H) × 810㎛(V)
(4) Cell Pitch	:	270㎛(H) × 810㎛(V) (Base : Green Cell)
(5) Display area	:	1106.5(H) × 622.1(V) ±0.5(mm)
(6) Outline dimension	:	1190(H) × 700(V)x 58(D) ±1(mm)
(7) Color arrangement	:	RGB Closed(Well) type
(8) Number of COLRO	:	(R)1024 × (G)1024 × (B)1024(10,737,000,000)
(9) Weight	:	22.0 ±0.5(Kg) : Net
	:	127 ±5(Kg) : 5EA/1BOX
(10) Aspect Ratio	:	16:9
(11) Peak Brightness	:	Typical 1000cd/㎡(1% White Window)
	:	Typical 90:1(Light room 100 Lx at center)
(12) Contrast Ratio	:	Typical 10,000:1(Dark room 1% White Window) (White Window Pattern at Center)
(13) POWER CONSUMPTION	:	Max 400 W(Full White)
(14) Lifetime	:	Over 60,000 Hrs (Initial brightness 1/2)

2) Block Diagram



Ⅲ. Formation and Specification of Module

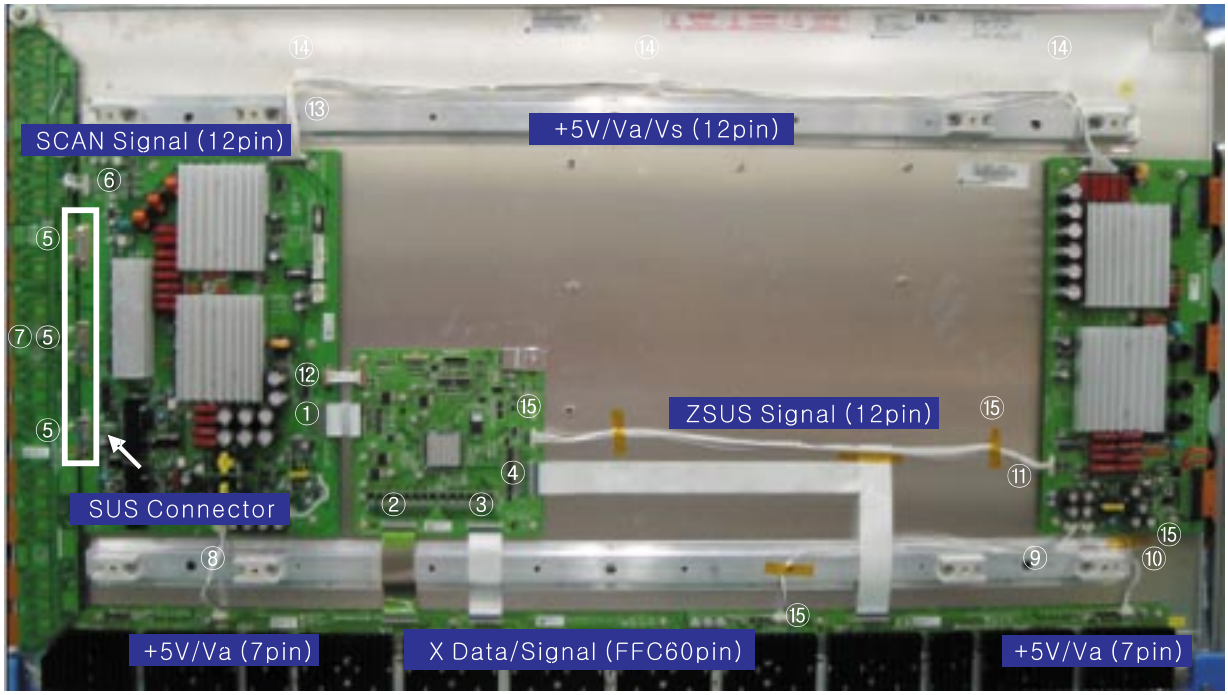
1. Formation of Module



No	Connector	Input Voltage & Signal
(1)	P1[Y SUS B/D]	Va, Vs
(2)	P11[Y SUS B/D]	5V, Va, Vs
(3)	P5[Y SUS B/D]	5V
(4)	P6[Y SUS B/D]	5V
(5)	P151[Z SUS B/D]	5V, Va, Vs
(6)	P300[CTRL B/D]	5V
(7)	P2[CTRL B/D]	Video Signal

No	Part No.		Description
①	6871QCH059A	PWB(PCB) ASS'Y	LVDS CTRL B/D ASS'Y
②	6871QDH088A	PWB(PCB) ASS'Y	Y DRV UPPER B/D ASS'Y
③	6871QDH089A	PWB(PCB) ASS'Y	Y DRV LOWER B/D ASS'Y
④	6871QYH039A	PWB(PCB) ASS'Y	Y SUS B/D ASS'Y
⑤	6871QZH044A	PWB(PCB) ASS'Y	Z SUS B/D ASS'Y
⑥	6871QLH049A	PWB(PCB) ASS'Y	X LEFT B/D ASS'Y
⑦	6871QXH030A	PWB(PCB) ASS'Y	X CENTER B/D ASS'Y
⑧	6871QRH057A	PWB(PCB) ASS'Y	X RIGHT B/D ASS'Y

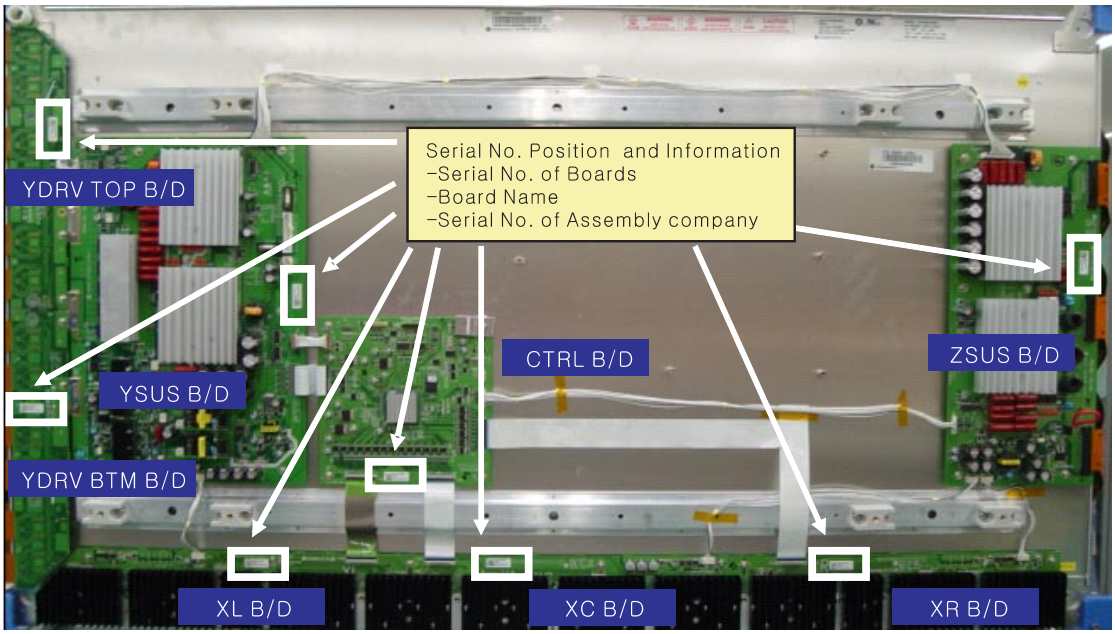
English



No	Part No.	EA	SPECIFICATION	Note
①	6850QV0001D	1EA	LG CABLE 30PIN 1.0MM PITCH 80MM	
②	6850QX0017B	1EA	0.5PITCH 60PIN 100MM FFC NON GROUND SHIELD TYPE	
③	6850QX0020A	1EA	LG CABLE 60PIN 0.5MM PITCH 100MM	
④	6850QX0014D	1EA	X B/D <--> CTRL B/D P=0.5MM 60PIN 530MM LG CABLE	
⑤	6630B00024A	3EA	SUS CONNECTOR FINE ALTEC NON NONE FOR V7,SHORT	
⑥	6631Q12008A	1EA	1.25MM 12PIN L50MM UL1061-28AWG YEON HO	
⑦	6631Q12005Q	1EA	1.25MM PITCH L40MM UL1061-28AWG, TAPPING	
⑧	6631Q15003E	1EA	1.5MM PITCH 7PIN L90MM UL1061-26AWG YEON-HO	
⑨	6631Q15003B	1EA	1.5MM PITCH 7PIN L340MM UL1061-24AWG	
⑩	6631Q15003C	1EA	1.5MM PITCH 7PIN L130MM UL1061-26AWG YEON-HO	
⑪	6631Q12005P	1EA	1.25MM L520MM UL1061-28AWG YEON-HO	
⑫	6631Q20002A	1EA	2.0MM 8PIN L40MM UL1007-24AWG LG CABLE	
⑬	6631Q25027B	1EA	2.5MM 12PIN L900MM UL1007-24AWG YEON HO	
⑭	4930Q00003A	3EA	CABLE HOLDER FOR 60X5(DONGABESTECH,DAAQC-02)	
⑮	7250QE0001A	0.25M	SINGLE FIXING COM. 10MMX33M	

2. Information of Boards

1) 50X3 PDP Module

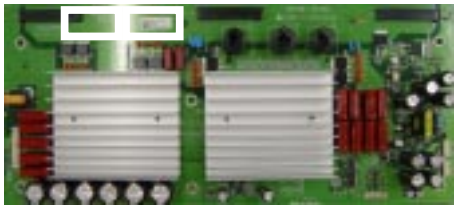


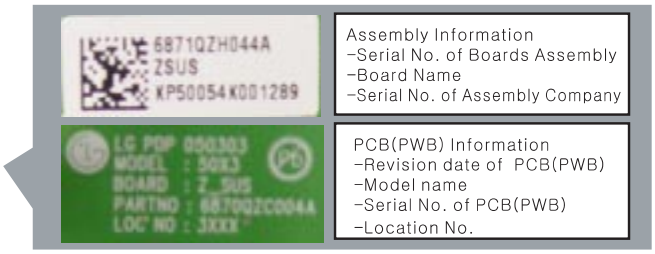
2) CTRL B/D

3) YSUS B/D

English

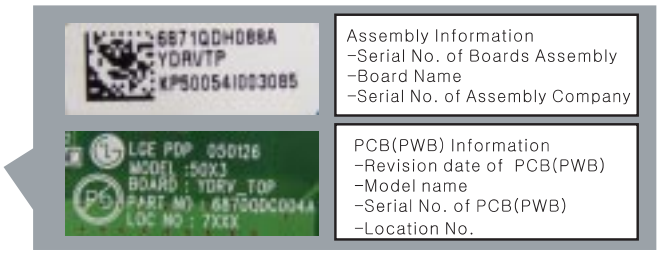
4) ZSUS B/D





5) YDRV TOP, BTM B/D

YDRV TOP



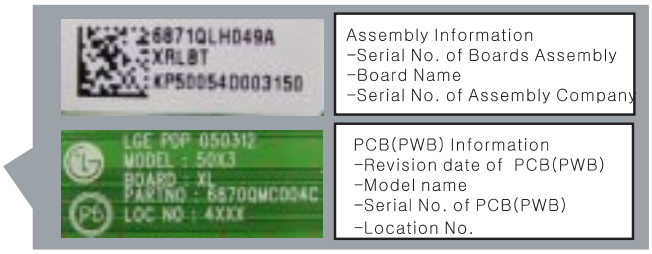
YDRV BTM

6) XL, XC, XR B/D

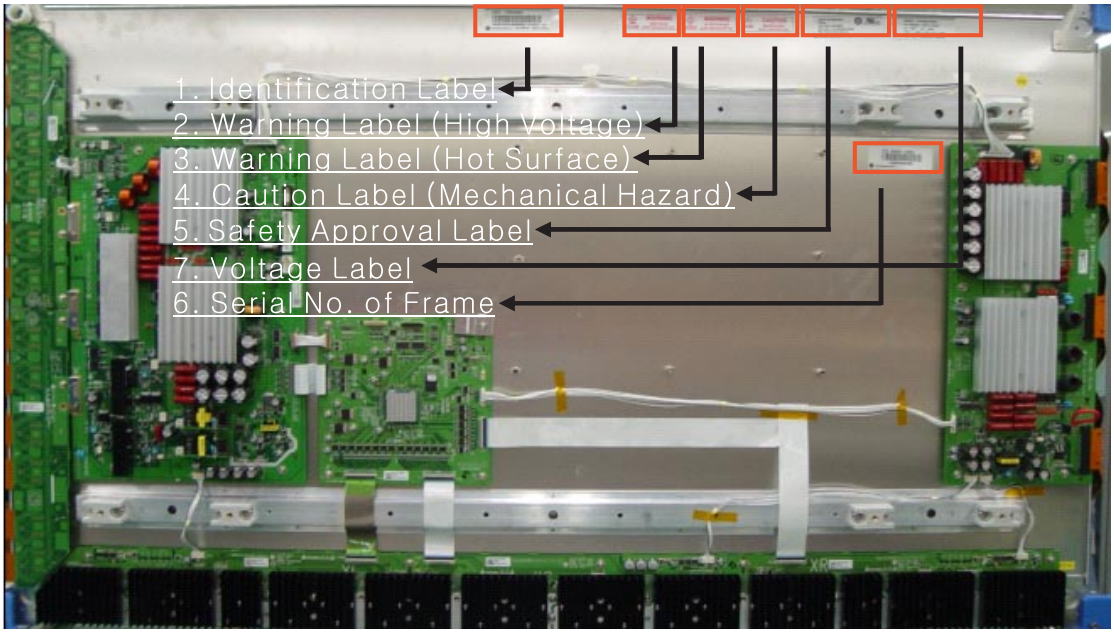
XL

XC

XR

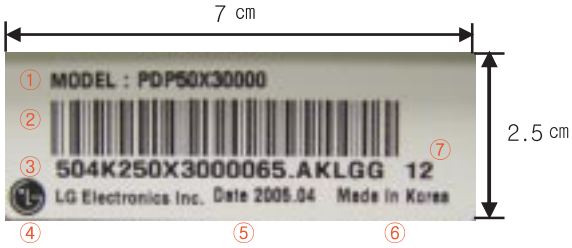


3. Label Information of Module



English

1) Identification Label



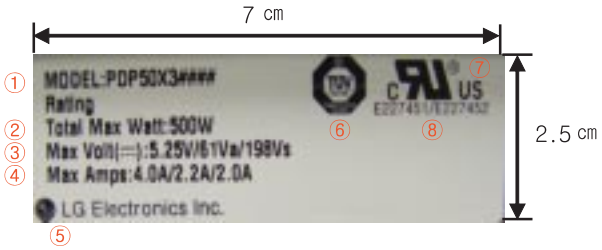
① Model Name
② Bar Code (Code 128, Contains the manufacture No.)
③ Manufacture No.
④ The trade name of LG Electronics
⑤ Manufactured date (Year & Month)
⑥ The place Origin
⑦ Model Suffix

2) Warning Label (High Voltage)

3) Warning Label (Hot Surface)

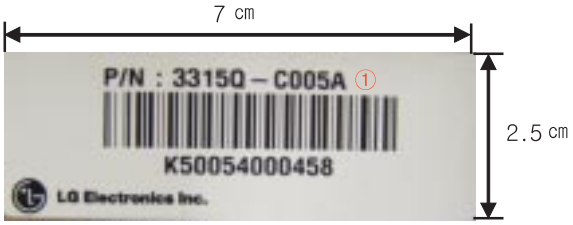
4) Caution Label (Mechanical Hazard)

5) Safety Approval Label



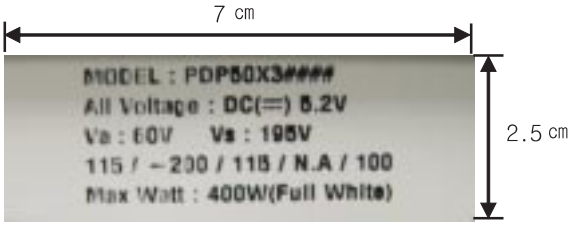
① Model Name
② Max. Watt (Full White)
③ Max. Volts
④ Max. Amps
⑤ The Trade Name of LG Electronics
⑥ TUV Approval Mark
⑦ UL Approval Mark
⑧ UL Approval No.

6) Serial No. of Frame



① Serial No of Frame Assy

7) Voltage Label (Model Name & Operational Voltage)



Ⅳ. Adjustment

1. Application Object

This standard is applied to the PDP50X3#### PDP Module which is manufactured of PDP promotion department or elsewhere.

2. Notes

(1) Without any special specification, the Module should be at the condition of preliminaries more than 10minutes before adjusting.
① Service signal : 100% Full White signal
② Service DC voltage : Vcc: 5V, Va: 60V, Vs: 195V
③ DC/DC Pack voltage : Vsc: 115V, Vzb = 100V, -Vy : -200V
④ Preliminaries environment : Temp (25±5°C), Relative humidity (65±10%)

(2) Aging shall be performed of module in order for characteristics stabilization after completion of assembling /adjustment. Conditions of aging are as follows.
① Service signal : 100% Full White, Red, Green, Blue pattern signal(Service time of each pattern : within 5minutes/cycle)
② Service DC voltage : Match the voltage with the set up voltage in the first adjustment.
③ Aging time : More than 4Hrs
④ Aging environment : Temp (25±2°C), Relative humidity- Less than 75%

(3) Module adjustment should be followed by below sequence.
① Initial voltage setting.(Vs=195V, Va=60V, Vcc=5V)
② -Vy Voltage adjustment (200V)
③ Vscan Voltage adjustment (115V)
④ Y ramp Waveform adjustment.
⑤ Y set_up Waveform adjustment.
⑥ Y set_down Waveform adjustment.
⑦ Vzb Voltage adjustment (100V)
But the above item may be altered by consideration of mass productivity.
(There shall be consultation and agreement of Research Office / Development Office / QA / Production Department in case when altering sequence order.)

(4) Without any special specification, you should adjust the Module in the environment of Temp (25±5°C) and Relative humidity (65±10%)

Caution) If you let the still image more than 10 minutes(especially The Digital pattern or Cross Hatch Pattern which has clear gradation), after image can be presented in the black level part of screen.

3. Adjustment after Assembling

3-1. Using Tools

Conditions of aging are as follows.
(1) Digital oscilloscope : More than 200MHz
(2) DVM(Digital Multimeter) : Fluke 187 or similar one
(3) Signal generator : VG-828 or similar one
(4) DC power supply
- DC power supply for Vs (1) : Should be changeable between 0V to 200V/ more than 10A
- DC power supply for Va (1) : Should be changeable between 0V to 100V/ more than 5A
- DC power supply for 5V (1) : Should be changeable between 0V to 10V/ more than 10A
- DC-DC Convertor Jig(1) : Vs, Va, 5V Jig with corresponding output to each voltage Pin arrangement of PDP50X3#### Module after the input of voltage.
- Voltage stability of power supply : Within ±1% for Vs/Va, within ±3% for 5V

3-2. Connection diagram of measuring instrument and setting up the initial voltage

(1) For connection diagram of measuring instrument, refer to (Fig.1) Connection diagram of measuring instrument
(2) Setting up the initial voltage
Vcc: 5V, Va: 60V, Vs: 195V
But, Initially setting up voltage can be changed by the set up range according to the Module's characteristic.

3-3. How to Adjust

1. Connect the measuring instrument to be (Fig.1).

2. How to adjust Y SUS(Adjustment should be done after setting Vs/Va to the set voltage)

(1) -Vy Voltage adjustment
① Measure the voltage between -Vy TP in the lower part D7 and in the upper part Q4 of Y SUS B/D, and adjust it.
② Turn the variable resistor of -Vy DD_pack(PS101) on Y SUS B/D to set to (-200 ±0.5V).

(2) Vscan Voltage adjustment
① Measure the voltage between the left Vsc TP and the Drain part of G2 on Y SUS B/D, and adjust.
② Turn the variable resistor of V scan DD_pack(PS102) on Y SUS B/D to set to (115 ±0.5V).

(3) Connect oscilloscope probe B1 and GND on Y sus B/D.

English

(4) Y ramp voltage waveform adjustment.

①Turn the VR51 on Y SUS B/D so that waveform A of (Fig. 2) be 10±5μs.

(5) Y set-up voltage waveform adjustment.

①Turn VR22 on Y SUS B/D so that waveform B of Figure(2) be 20 ±5μs.

(6) Y set-down voltage waveform adjustment.

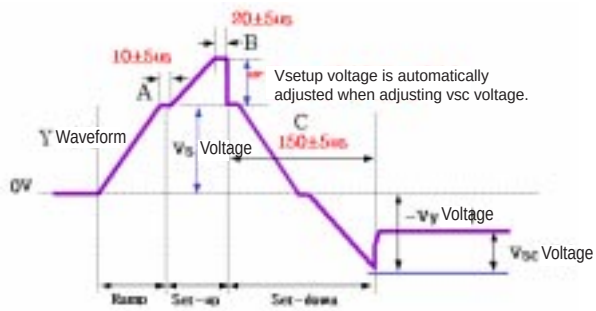
①Turn the variable resistor VR2(Set _dn_Vy)on Y SUS B/D so that waveform C of (Fig. 2) be 10±5μs.

3. How to adjust ZSUS (Adjustment should be done after setting Vs/Va to the set voltage)

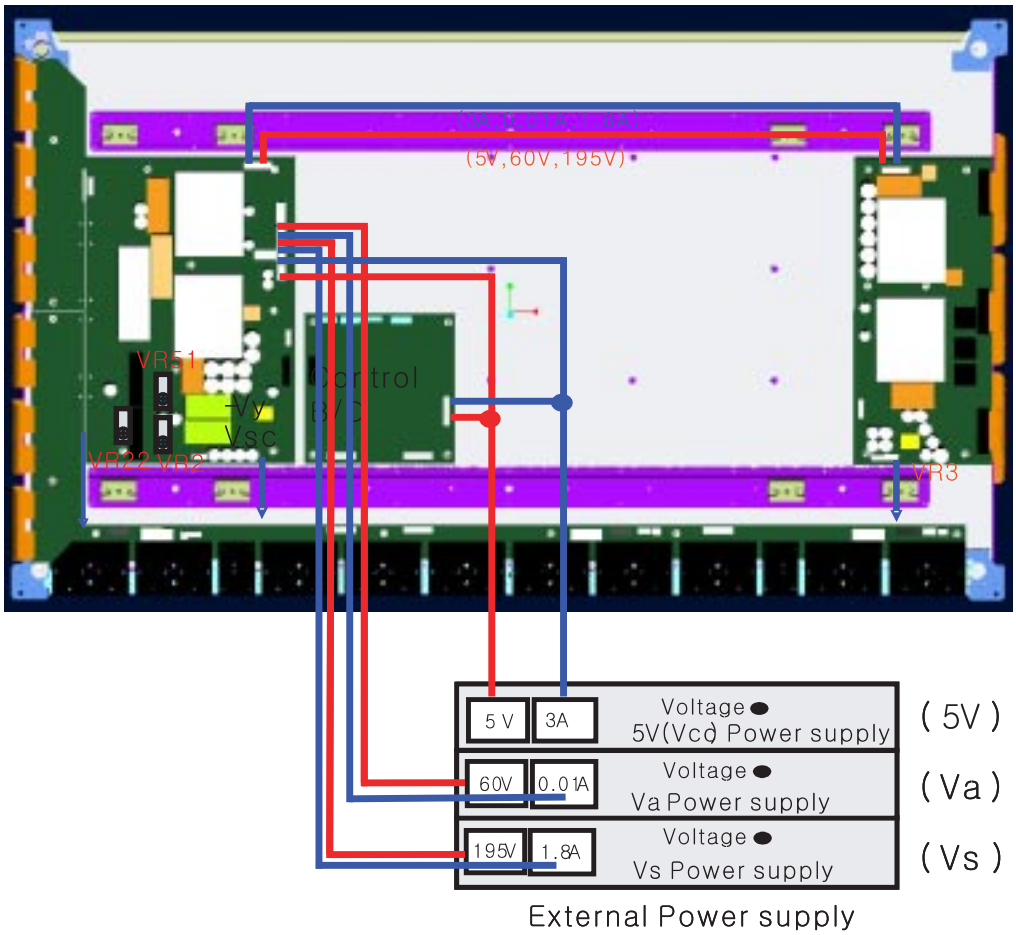
(1) Vzb(Z bias) voltage adjustment.

①For Vzb voltage, measure and adjust the voltage by applying each of (-) terminal and (+) terminal in DMM to the both terminals in R111.

②Turn the variable resistance of VR3 on Z SUS B/D to set to 100 ±0.5V.



(Fig. 2) Y set-up Waveform



<Caution>

(1) The power of the signal generator should be turned on before turning on the power of DC power supply.

(2) The voltage of DC power supply, in standard of Module input voltage, should be preset as below. (Vs: 195V, Va: 60V)

(3) The power of power supply must turned on by this sequence. Reverse direction When turning off.
* Module on : 5V → Va → Vs, * Module off : Va → Vs → 5V

(4) Signal generator should be selected with 1366 x 768 mode.

(Fig. 1) Connection diagram of measuring instrument

English

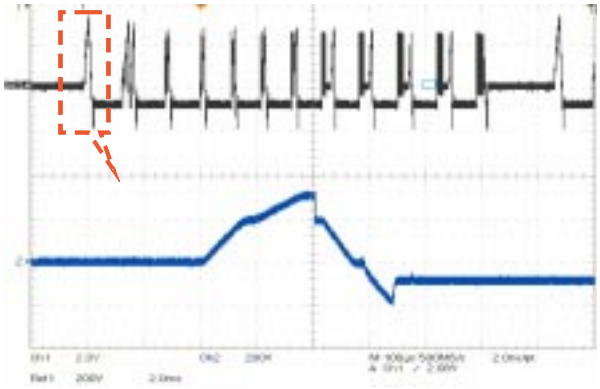
Ⅴ. Trouble Shooting

1. Checking for No Picture

A screen doesn't display at all and condition of black pattern or power off.

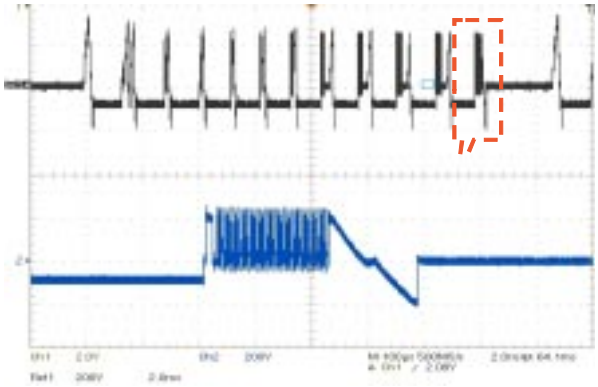
(1) Check whether the CTRL B/D LED[D1,D15] is turned on or not.
(2) Check the power and signal cable of CTRL B/D.
(3) X B/D, Y B/D, Z B/D is well plugged in.
(4) Check the connection of X B/D, Y B/D and Z B/D to CTRL B/D.
(5) Measure the output wave of X, Y, Z B/D with oscilloscope(more than 200MHz) and find the trouble of B/D by comparing the output wave with below figure.
- Measure Point fo Y B/D : TP(Bead B1)
- Measure Point fo Z B/D : TP(Bead B10)

(6) Check the SCAN(Y side) IC
(7) Check the DATA(X side) TCP IC
(8) Replace the CTRL B/D.



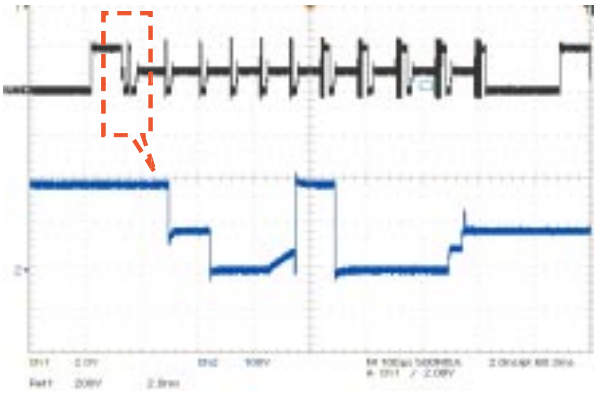
< A: Y B/D Output wave - 1 FRAME >

< B: Y B/D Output wave -1 SF >



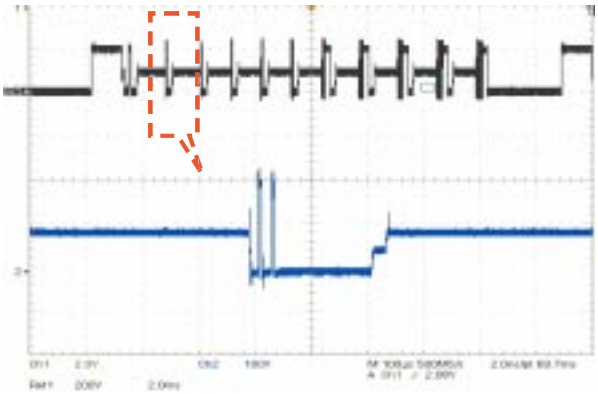
< A: Y B/D Output wave - 1 FRAME >

< B: Y B/D Output wave - Last Sustain >



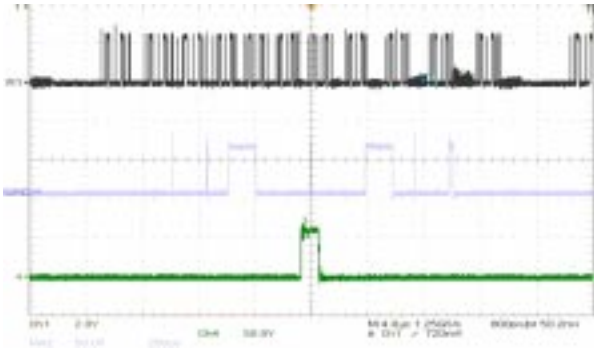
< A: Z B/D Output wave - 1 FRAME >

< B: Z B/D Output wave - 1~2 SF >



< A: Z B/D Output wave - 1 FRAME >

< B: Z B/D Output wave - 3~11SF >



< X B/D Output wave - 1 FRAME >

< X B/D Output wave - 1 SF >

< X B/D Output wave - Extension >

English

2. Hitch Diagnosis Following Display Condition

2-1. 1/3 of the screen doesn't be shown

1) Check the power connector of X B/D, corresponding to the screen failure part.
2) Check the connector between CTRL B/D and X B/D, corresponding to the screen failure part.
3) Replace the corresponding X B/D. For X B/D replacement, check the TCP is correctly connected .

※ Relationship between screen and X B/D

Screen		X B/D
Left of the Screen 1/3	↔	Right X B/D
Center of the Screen 1/3	↔	Center X B/D
Right of the Screen 1/3	↔	Left X B/D

※ Screen Display Form

i) Left of the Screen(1/3) ii) Center of the Screen(1/3) iii) Right of the Screen(1/3)

2-2. 1/4 of the screen doesn't be shown

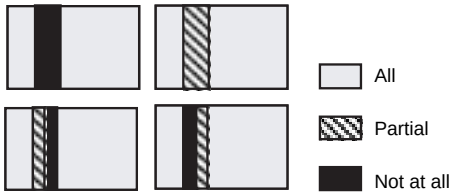
Identical to 2-1

2-3. Screen doesn't be shown as Data TCP(Include not be shown part of Data TCP quantity or a part)

1) If there is no change after replacement of cable between CTRL B/D and X B/D, replace CTRL B/D.
2) Check Data TCP failures, corresponding part to screen failure, and if no defects, connect the corresponding TCP again.
3) If the corresponding Data TCP fails, Module should be replaced.

※ The screen display form

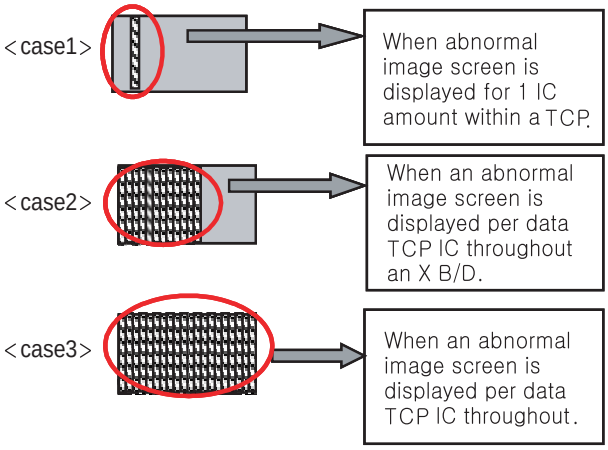
(Anything of the 22 Data TCP can be shown beside below pictures)



2-4. It is generated Unusual Pattern of Data TCP IC unit

1) If it happens as line shape or dot shape, screw the X B/D again, and if no change, replace the X B/D.
2) For <case 1>
   - Check the connection of Data TCP connector
   - Replace the corresponding X B/D or CTRL B/D.
3) In case of <case 2>, <case 3>
   - Check connector connecting the CTRL B/D to relevant X B/D.
   – Replace the relevant X B/D or CTRL B/D.

※ Screen Display Form

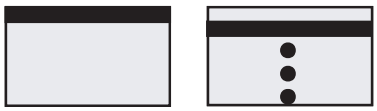


※ After separating TCP HEAT SINK, replace Silicon tape when the TCP IC marks in Silicon tape of H/S feel hard.(silicon tape, 7250SC0006C, TP-2460 DOW CORNING 8.0MM T0.50 NON GRAY,50X3(L363)

2-5. Screen doesn't be shown at all as Scan FPC.

(1) It's may be a problem between Scan FPC and Y DRV B/D.
(2) Check the connection of Y DRV B/D and Scan FPC.
(3) If the Scan IC is failed, replace the Y DRV B/D.

※ Screen Display Form



one twelve of screen

The screen display is very good

The screen display is poor

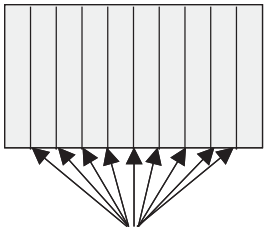
※ Check a method of SCAN IC

Change the Vpp Pin into ANODE and GND Pin into CATHOD and then test the Diode with forward or reverse direction.

2-6. Regular stripe is generated at regular internal on the whole screen. (A vertical stripe flash at especial color)

(1) This is a problem about CTRL B/D.
(2) Replace the CTRL B/D.

※ Screen Display Form



The screen has a vertical line with regular gap

2-7. Data copy is generated to stripe direction.

(1) In this case, it's due to incorrect marking of scan wave.
(2) Replace the Y DRV B/D or Y B/D.

※ Screen Display Form

<Display Pattern>

<Case 1 : Entire Copy>

<Case 2 : Top Copy>

<Case 3 : Bottom Copy>

<Case 2 : Entire Copy>

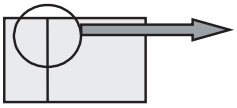
English

2-8. The screen has one several vertical line.

(1) In this case, It isn't a problem about CTRL B/D or X B/D.
(2) It may cause followings.
- It's out of order a panel
- Open or short of DATA TCP attached panel
- It's out of order a DATA TCP IC attached panel

(3) Replace Module.

※ Screen Display Form



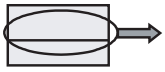
It may show several vertical lines in a quarter or other division part of screen including left case.

2- 9. The screen has one or several horizontal line.

(1) In this case, it isn't a problem about CTRL B/D or Y B/D.
(2) It may cause followings.
- It's out of order a panel
- Open or short of SCAN FPC attached panel
- It's out of order a SCAN IC attached panel

(3) Replace Module.

※ Screen Display Form



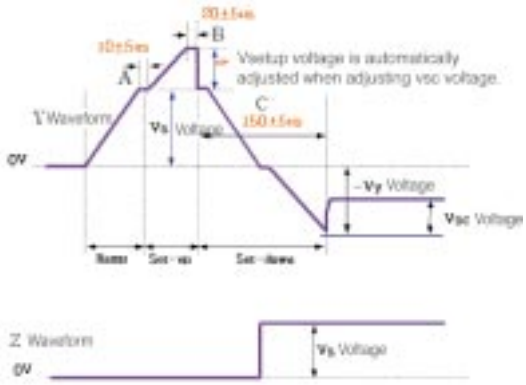
It may show several horizontal lines including left case.

2-10. Lightness of screen is wholly darken though there is input-signal-pattern

(1) In this case, Z B/D operation isn't complete.
(2) Check the power cord of Z B/D.
(3) Check the connector of Z B/D and CTRL B/D.
(4) Replace the CTRL B/D or Z B/D.

2-11. The screen displays other color partially on full white screen or happens Mis-discharge partially on full black screen.

(1) Check the declination of Y B/D set up, set down wave.
(2) Measure each output wave with oscilloscope(more than 200MHz) and compare the data with below figure data. The slope of ramp in B/D is VR51, The slope of set_up is VR22, The slope of set_down is VR2, The voltage of -Vy and Vscan is respectively PS101 and PS 102. for these, Vzd of Z B/D adjust as indicated in Label by making VR3 variable.
- Measuring Point of Y B/D : B1
- Measuring Point of Z B/D : B10



12. It doesn't display a specified brightness at specified color

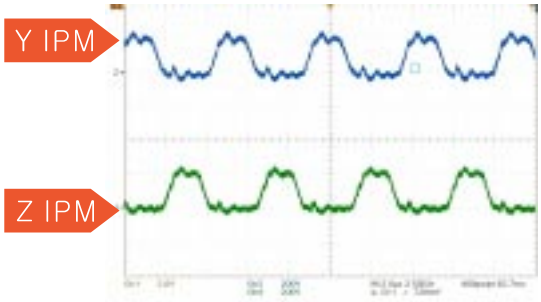
(1) Check the connector of CTRL B/D input signal.
(2) Replace the CTRL B/D.

3. Checking for Component Damage

3-1. Y IPM(IC201, IC202) or Z IPM(IC7, IC5) Damage

(1) When the internal Sustain FET or Z SUS IPM(IC7) of Y SUS IPM(IC 202) is damaged, screen doesn't be shown or Mis - discharge of partial screen is generated.
- Test Point : GND~B1(Y B/D), GND~B10(Z B/D).
- Wave format : B1(Y B/D) or B10(Z B/D) has no output wave.

(2) When the internal ER_FET or Z ER IPM(IC5) of Y ER IPM(IC 201) is damaged, screen doesn't be shown or lectric discharge of entire screen is generated.
- Test Point : GND~B1(Y B/D), GND~B10(Z B/D).
- Wave format : B1(Y B/D) or B10(Z B/D) has no output wave.



<IPM Normal Output Wave>

- Measurance position : Sustain section enlarge the after measuring B1 wave of Y B/D and B10 wave of Z B/D. (Full White Pattern)

3-2. FET Ass'y(Y B/D : HS1, HS2, HS3) Damage

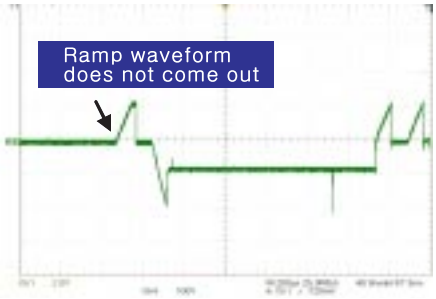
(1) When Pass Set_Up FET(Q10) is damaged, screen doesn't be shown.
- Test Point : Enlarge the after measuring GND~B1(Y B/D)
- Wave format : As shown fig. 2

<Fig. 2 When the Pass Set_Up FET is damaged>

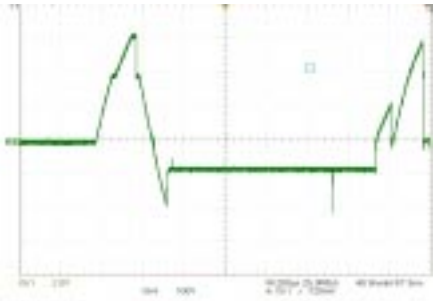
(2) When Set_Down FET/Pass_Top FET(HS1, HS3) is damaged, Mis - discharge of entire screen is generated.
- Test Point : Enlarge the after measuring GND~B1(Y B/D)
- Wave format : As shown fig. 3

<Fig. 3 When the Set_Down FET is damaged>

(3) When Ramp FET(HS2) is damaged.
- Test Point : Enlarge the after measuring GND~B1(Y B/D)
- Wave format : As shown fig. 4



<Fig. 4 When the Ramp FET is damaged>



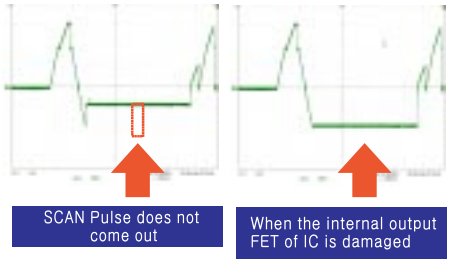
<FET Ass'y normal output wave>

- Measurance position : Reset section enlargement wave of B1(Y B/D) (Full White Pattern)

English

3-3. SCAN IC(Y DRV B/D : IC1~6, IC101~106) Damage

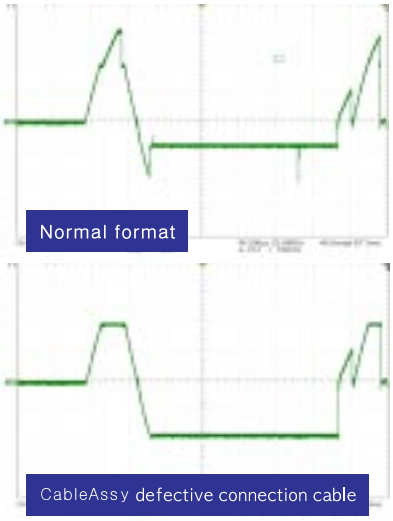
(1) In case of SCAN IC poor, one horizontal line may open at screen.
- Test Point: ICT measurance of GND~Y DRV B/D output
- Wave format : As shown fig. 4



<Fig. 3 When SCAN IC is poor>

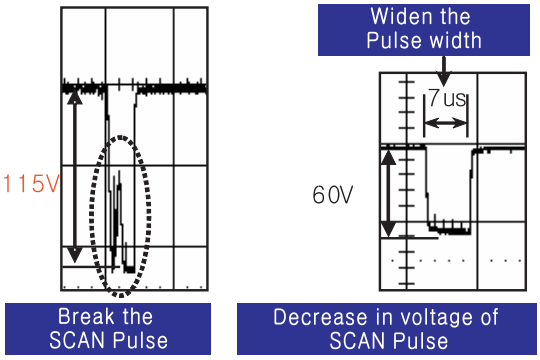
(2) Screen may not shown when SCAN IC is damaged by SCAN IC poor, external electricity or spark.
- Test Point : ICT measurance of GND~Y DRV B/D output
- Wave format : Output wave format isn't output (You can see the damage for Y DRV B/D Top or Bottom's SCAN IC)

(3) In case of defects in Ass' y, connecting cable between Y DRV B/D(Top, Bottom) and Ysus, pictures will not appear.
- Test Point : ICT measurance of GND~Y DRV B/D output
- Wave format : As shown fig. 5

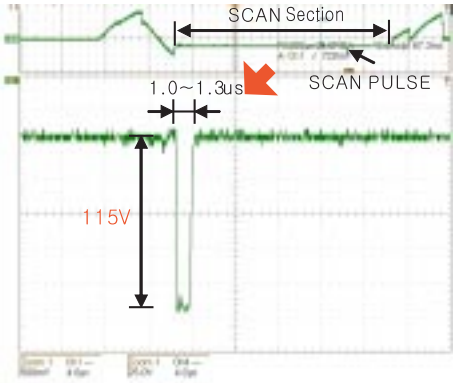


<Fig. 5 In case of defective connection cable between Y DRV B/D(Top, Bottom).>

(4) In case of shorting the SCAN IC output by a dust, foreign substance, it may overlap two horizontal lines on screen.
- Test Point : ICT measurance of GND~Y DRV B/D output
- Wave format : As shown fig. 6
- Measurance position : SCAN section enlarge the after



<Fig. 6 When SCAN IC output is short>

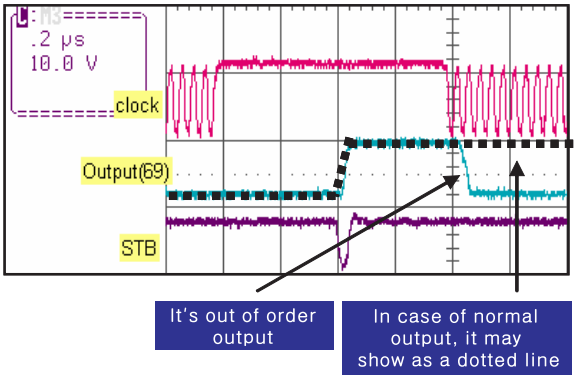


<SCAN IC Normal Output Wave >

measuring output ICT of Y DRV B/D.
(Full White Pattern)

3-4. TCP Damage

(1) In case of shorting or opening the IC output of TCP, it may show one or several vertical lines.
- Test Point : Enlarge the after measuring output TP of GND~TCP
- Wave format : As shown output fig. 7
  In case of normal wave output, when STB signal is generated, maintain High output. And when STB signal is generated again must be fall Low.
  But when IC of TCP is poor, STB signal is not generated Output falls with Low.

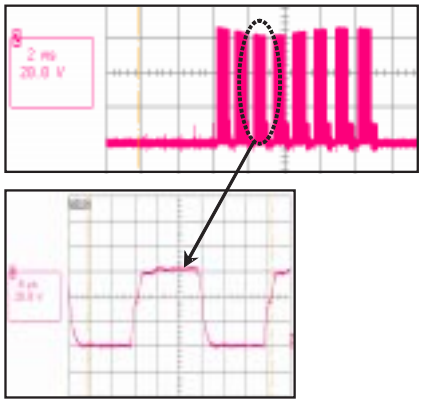


<Fig. 7 When IC output of COF is poor>

※ Remove SR before measuring because the output TP of TCP is covered with SR. Insulate again with insulating tape after measuring.

(2) In case of IC damage, corresponding IC inside of TCP, pictures by IC unit inside of TCP will not appear or Mis - discharge. In most cases, the burnt mark can be seen when IC failure occurs.

- Test Point : Measure the output of GND~TCP before expanding.
- Wave format : Output wave doesn't come out



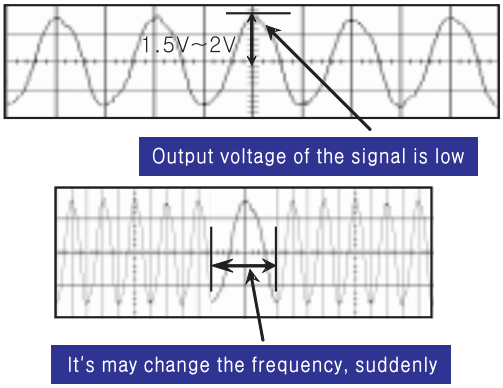
<TCP Normal Output Wave >

- Measurance position : Enlarge the after measuring output TP of TCP (Full White Pattern)

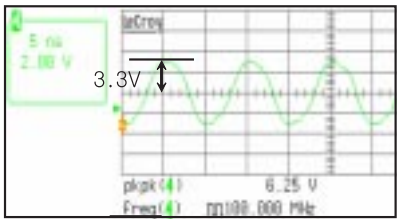
3-5. Crystal(CTRL B/D : X2) Damage

(1) When Crystal is damage, the screen doesn't be shown.
- Test Point : Measuring 3pin of GND~Crystal(CTRL B/D: X2)
- Wave format : Output wave doesn't come out

(2) In case of unusual launch of the Crystal, it may blink the screen.
- Wave format : As shown fig. 8



<Fig. 8 When Crystal is poor>



<Crystal Normal Output Wave >

- Measurance position : Measuring output 3pin of Crystal(X2 : 100MHz) on CTRL B/D (Full White Pattern)

4. Shift breakdown component compatibility consideration

4-1. Scan IC follows in application, compatibility of Y DRV Top, Bottom B/D

(1) When B/D applicated SN755866 is breakdown, you must mutually only replace Top B/D and Bottom B/D applicated SN755866.
(2) When IC of B/D applicated SN755866 IC is breakdown, you must only replace SN755866 IC.
Different IC application being not right

SN755866 applicated B/D TOP: 6871QDH088A BTM: 6871QDH089A	When B/D is breakdown →	**Only use B/D applicated SN755866** TOP: 6871QDH088A BTM: 6871QDH089A
SN755866 applicated B/D TOP: 6871QDH088A BTM: 6871QDH089A	When IC is breakdown →	**Only use SN755866 IC** IC : 0ILNRTI020A

※ When replacing the IC, notice
To prevent dust, fix the same IC after removing the silicon and then it again stick the IC.

Silicon Part No. : 7254Q00002A (Tube Type) 7254Q00002B (Can Type)

English

Ⅵ. Safety Components List

(1) The safety components list of PDP50X3#### Model is as below.

(2) A component of Ⓢ mark is important to keep product's security. Therefore in exchanging a component, appointed component is necessary used.

(3) Ⓢ is an abbreviated word which is instead of <Safety>mark.

	C26,57,58	C8,9,10,11	C143
Y Sus B/D	250v 150㎌ Samwha	100v 150㎌ Samwha	160v 47㎌ Samwha
IC101	FL1	D 35,36	Ⓢ FS2,3
NATIONAL LM2585S	NIGATA STC682D	SHINDENGEN 20LC30 F20LC30	Littelfuse T4.0AH, 250V
Ⓢ T101	Ⓢ L201,202,203	Ⓢ FS1	Ⓢ IC201,202
GET Plus 10pin W020A, 15uH	GET Plus( ) 0.9uH D0018A	10A Littelfuse 10A, 125V	Heatsink(IPM) 100*81*24*1(mm)
Ⓢ FS4	Ⓢ Fuse holder	Ⓢ FL2	Ⓢ P20
1.5A Littelfuse 1.5A, 125V	Triad Littelfuse 10A, 300V	GET Plus( ) Woolim( ) 6200JB8011J 60uH	Optical Isolator Auk Corp. SPC717M( )
Ⓢ HS1	Ⓢ HS2,3	Ⓢ PS101	Ⓢ PS102
Heat Sink 112*30*35*1(mm)	Heat Sink 60*15*25*1(mm)	LG Innotek YPCD-J002D	LG Innotek YPCD-J003D
Ⓢ T20	Ⓢ T20	Ⓢ P20	
SamWha Tecom 0047W-F, 940uH	SamWha Tecom 0047U-F, 1.2mH	Optical Isolator Auk Corp. SPC717M( )	
	C153,154	C7,23,24,28	C65,74,75
Z Sus B/D	250v 150㎌ Samwha	100v 150㎌ Samwha	160v 68㎌ Samwha
FL151	D201,202,203	Ⓢ T2	Ⓢ L201,202,203
NIGATA STC682D	SHINDENGEN 20LC30 F20LC30	GET Plus 10pin W015A , 3,2mH	D0014A GET Plus( ) 0.9uH D0014A

FS1	FL152	IC7,5	
1.5A, 125V	GET Plus( ) Woolim( ) 6200JB8011J	Heatsink(IPM) 100*81*24*1 (mm)	
	FPC	50"Frame	50"Glass
Panel	YoungPoongYO`serise( ) DaeduckGDS F1-0 ( ) flammability : 94V-0	Muyang 1190*700*1.5 (mm)	Asahi glass Front:1164*650*2.5(mm) Back:1144*670*2.5(mm)
	Thermal Pad	TCP	TCP Heat Sink
X B/D	Dow Corning TP 2460( )	UBE Industries (C)S(I) ( ) Flammability : VTM-0	Heat Sink (TCP) 561*63*30*1.2 (mm)
	IC1		
CTRL B/D	Heat Sink(ASIC) 30*30*4*2 (mm)		

English

Ⅶ. Records of Revision for Boards, components and ROM DATA

1. Boards

No.	Date	Board	Part Number	Note
1	2005.05.01	CTRL B/D ASS'Y(LVDS)	6871QCH059A	Initial Product
2	2005.05.01	YDRV UPPERB/D ASS'Y	6871QDH088A	Initial Product
3	2005.05.01	YDRV LOWER B/D ASS'Y	6871QDH089A	Initial Product
4	2005.05.01	Y SUS B/D ASS'Y	6871QYH039A	Initial Product
5	2005.05.01	Z B/D ASS'Y	6871QZH044A	Initial Product
6	2005.05.01	X LEFT B/D ASS'Y	6871QLH049A	Initial Product
7	2005.05.01	X CENTER B/D ASS'Y	6871QXH030A	Initial Product
8	2005.05.01	X RIGHT B/D ASS'Y	6871QRH057A	Initial Product

2. COMPONENTS

No.	Date	Board	Part Number	Note
1	2005.05.01	YSUSIPM(IC201,IC202)	4921QP1038A	Initial Product
2	2005.05.01	ZSUS IPM(IC7,IC5)	4921QP1033A	Initial Product
3	2005.05.01	Y Path FET Ass'y(HS1)	4921QF5004A	Initial Product
4	2005.05.01	DDPACK_D2(PS101)	6871QEH022A	Initial Product
5	2005.05.01	DDPACK_D3(PS102)	6871QEH023A	Initial Product
6	2005.05.01	MCM LGPCMx1224	6001QX0004A	Initial Product
7	2005.05.01	CRYSTAL(X2)	6212AB4004A	Initial Product
8	2005.05.01	TCP	0ILNR00018A	Initial Product

English

3. ROM DATA

No.	Date	ROM Data Version	Contents
1	2005.05.01	50X3ST01B	External Type LVDS Initial ROM Data

3. PDP60X6#### Module

CONTENTS

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Ⅱ. Technical Feature
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Ⅴ. Trouble Shooting
1. Checking for No Picture
2. Hitch Diagnosis Following Display Condition
2-1. 3/11 or 4/11 of the screen is not displayed.
2-2. Screen doesn't be shown as Data TCP.
2-3. It is generated unusual pattern of Data TCP IC unit.
2-4. Regular vertical lines are shown for area of one Data TCP IC or more.
2-5. Screen doesn't be shown at all as Scan FPC.
2-6. Regular stripe is generated at regular internal on the whole screen.
2-7. Data copy is generated to stripe direction.
2-8. The screen has one several vertical line.
2-9. The screen has one or several horizontal line.
2-10. Lightness of screen is wholly darken though there is input-signal-pattern.
2-11. The screen displays other color partially on Full White screen or happens Mis-discharge partially on Full Black screen.
2-12. During the Full White pattern display, it gets darker toward the center.
2-13. It doesn't display a specified brightness at specified color.
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3-1. Y IPM(IC2, IC7) or Z IPM(IC3, IC7) damage
3-2. FET Ass'y(Y SUS B/D : HS2, Z SUS B/D : HS1) damage
3-3. SCAN IC damage (Y DRV B/D Top : IC21, IC20, IC17, IC18, IC26, IC29
Y DRV B/D Btm : IC11, IC14, IC12, IC25, IC13, IC27)
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Ⅶ. Records of Revision for Boards, Components and ROM DATA
* Annexing : Schematic Diagram

Ⅰ. Safety Precautions

When servicing of PDP Module, it should be not enforced into another way aside next rule, or a unaccustomed person should not repairing.
When using/handling this PDP Module, pay attention to the below warning and cautions.

⚠ Warning

Indicates a hazard that may lead to death or injury if the warning is ignored and the product is handled incorrectly.

⚠ Caution

Indicates a hazard that can lead to injury or damage to property if the caution is ignored and the product is handled incorrectly.

1. WARNING

(1) Do not touch Signal and Power Connector while this product operates.

(2) Do not supply a voltage higher than that specified to this product. This may damage the product and may cause a fire.

(3) Do not use this product in locations where the humidity is extremely high, where it may be splashed with water, or where flammable materials surround it.
Do not install or use the product in a location that does not satisfy the specified environmental conditions. This may damage the product and may cause a fire.

(4) If a foreign substance (such as water, metal, or liquid) gets inside the product, immediately turn off the power.
Continuing to use the product, it is may cause fire or electric shock.

(5) If the product emits smoke, and abnormal smell, or makes an abnormal sound, immediately turn off the power.
Continuing to use the product, it may cause fire or electric shock.

(6) Do not disconnect or connect the connector while power to the product is on. It takes some time for the voltage to drop to a sufficiently low level after the power has been turned off.
Confirm that the voltage has dropped to a safe level before disconnecting or connecting the connector.

(7) Do not pull out or insert the power cable from/to an outlet with wet hands. It may cause electric shock.

(8) Do not damage or modify the power cable. It may cause fire or electric shock.

(9) If the power cable is damaged, or if the connector is loose, do not use the product : otherwise, this can lead to fire or electric shock.

(10) If the power connector or the connector of the power cable becomes dirty or dusty, wipe it with a dry cloth. Otherwise, this can lead to fire.

(11) PDP Module uses a high voltage (Max.450V dc). Keep the cautions concerning electric shock and do not touch the Device circuitry when handling the PDP Unit. And because the capacitor of the Device circuitry may remain charged at the moment of Power OFF, standing by for 1 minute is required in order to touch the Device circuitry.

2. CAUTIONS

(1) Do not place this product in a location that is subject to heavy vibration, or on an unstable surface such as an inclined surface. The product may fall off or fall over, causing injuries.

(2) Before disconnecting cable from the product, be sure to turn off the power. Be sure to hold the connector when disconnecting cables. Pulling a cable with excessive force may cause the core of the cable to be exposed or break the cable, and this can lead to fire or electric shock.

(3) This product should be moved by two or more persons. If one person attempts to carry this product alone, he/she may be injured.

(4) This product contains glass. The glass may break, causing injuries, if shock, vibration, heat, or distortion is applied to the product.

(5) The temperature of the glass of the display may rise to 80°C or more depending on the conditions of use.
If you touch the glass inadvertently, you may be burned.

(6) If glass surface of the display breaks or is scratched, do not touch the broken pieces or the scratches with bare hands. You may be injured.

(7) PDP Module requires to be handled with care not to be touched with metal or hard materials, and must not be stressed by heat or mechanical impact.

(8) There are some exposed components on the rear panel of this product. Touching these components may cause an electric shock.

(9) When moving the product, be sure to turn off the power and disconnect all the cables. While moving the product, watch your step. The product may be dropped or all, leading to injuries of electric shock.

(10) In order to protect static electricity due to C-MOS circuitry of the Drive part, wear a wrist band to protect static electricity when handling.

(11) If cleaning the Panel, wipe it with a soft cloth moistened with water or a neutral detergent and squeezed, being careful not to touch the connector part of the Panel. And don't use chemical materials like thinner or benzene.

(12) If this product is used as a display board to display a static image, "image sticking" occurs. This means that the luminance of areas of the display that remain lit for a long time drops compared with luminance of areas that are lit for a shorter time, causing uneven luminance across the display.
The degree to which this occurs is in proportion to the luminance at which the display is used. To prevent this phenomenon, therefore, avoid static images as much as possible and design your system so that it is used at a low luminance, by reducing signal level difference between bright area and less bright area through signal processing.

(13) Because PDP Module emits heat from the Glass Panel part and the Drive circuitry, the environmental temperature must not be over 40°C.
The temperature of the Glass Panel part is especially high owing to heat from internal Drive circuitry. And because the PDP Module is driven by high voltage, it must avoid conductive materials.

(14) If inserting components or circuit board in order to repair, be sure to fix a lead line to the connector before soldering.

(15) If inserting high-power resistor(metal-oxide film resistor or metal film resistor) in order to repair, insert it as 10mm away as from a board.

(16) During repairs, high voltage or high temperature components must be put away from a lead line.

(17) This is a Cold Chassis but you had better use a cold transformer for safety during repairs. If repairing electricity source part, you must use the cold transformer.

(18) Do not place an object on the glass surface of the display. The glass may break or be scratched.

(19) This product may be damaged if it is subject to excessive stresses (such as excessive voltage, current, or temperature). The absolute maximum ratings specify the limits of these stresses.

(20) The recommended operating conditions are conditions in which the normal operation of this product is guaranteed. All the rated values of the electrical specifications are guaranteed within these conditions.
Always use the product within the range of the recommended operating conditions. Otherwise, the reliability of the product may be degraded.

(21) This product has a glass display surface. Design your system so that excessive shock and load are not applied to the glass. Exercise care that the vent at the corner of the glass panel is not damaged.
If the glass panel or vent is damaged, the product is inoperable.

(22) Do not cover or wrap the product with a cloth or other covering while power is supplied to the product.

(23) Before turning on power to the product, check the wiring of the product and confirm that the supply voltage is within the rated voltage range. If the wiring is wrong or if a voltage outside the rated range is applied, the product may malfunction or be damaged.

(24) Do not store this product in a location where temperature and humidity are high. This may cause the product to malfunction. Because this product uses a discharge phenomenon, it may take time to light (operation may be delayed) when the product is used after it has been stored for a long time. In this case, it is recommended to light all cells for about 2 hours (aging).

(25) This product is made from various materials such as glass, metal, and plastic. When discarding it, be sure to contact a professional waste disposal operator.

(26) If faults occur due to arbitrary modification or disassembly, LG Electronics is not responsible for function, quality or other items.

(27) Use of the product with a combination of parameters, conditions, or logic not specified in the specifications of this product is not guaranteed. If intending to use the product in such a way, be sure to consult LG Electronics in advance.

(28) With in the warranty period, general faults that occur due to defects in components such as ICs will be rectified by LG Electronics with out charge. However, IMAGE STICKING due to misapplying the above (12) provision is not included in the warranty. Repairs due to the other faults may be charged for depending on responsibility for the faults.

3. Warning label for PDP Module

1) PCB Warning label

(1) Warning

WARNING

Warning against any dangers under certain circumstance.

(2) Hot surface

Warning against any possibilities of injury or burn due to high temperature under certain circumstance.

(3) Dangerous voltage

Warning against the possibility of electric shock under certain circumstance.

(4) Electrostatic sensitive devices

Warning against any possibilities of electric shock/high temperature by touching under certain circumstance.

(5) Caution sentence

CAUTION : HIGH VOLTAGE

Warning against the danger of electric shock when touching.

(6) Fuse Caution sentence

CAUTION

FOR CONTINUED PROTECTION AGAINST RISK OF FIRE,
REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE(S).

The fuse should be replaced with the same type and rating to prevent fire under certain circumstance.

2) Safety precautions on Module

(1) High Voltage

Warning against the danger of electric shock when touching due to dangerous high voltage.

(2) Hot Surface

Warning against the danger of burn when touching due to high temperature parts.

(3) Wound

Caution against the danger of mechanical injuries.

English

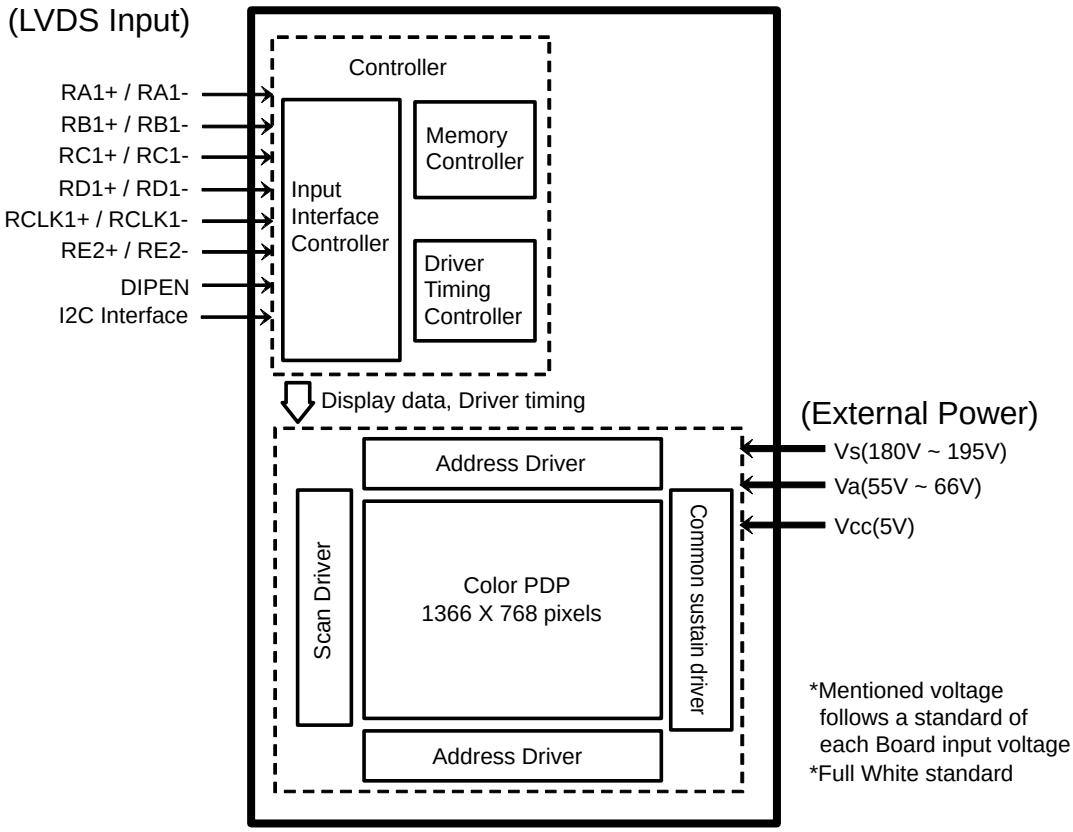
Ⅱ. Technical Feature

PDP Module is a display device to be divided into a Panel part and a Drive part.The Panel part consists of Electrodes, Phosphor, various dielectrics and gas, and the Drive part includes electronic circuitry and PCB.
PDP60X6#### model produced in the LG Electronics is 60inches color Plasma display module of Wide XGA(1366(H) x 768(V)), and it is a display device giving concrete to bright image by using AC Plasma technology of LG Electronics.

1) General Specification

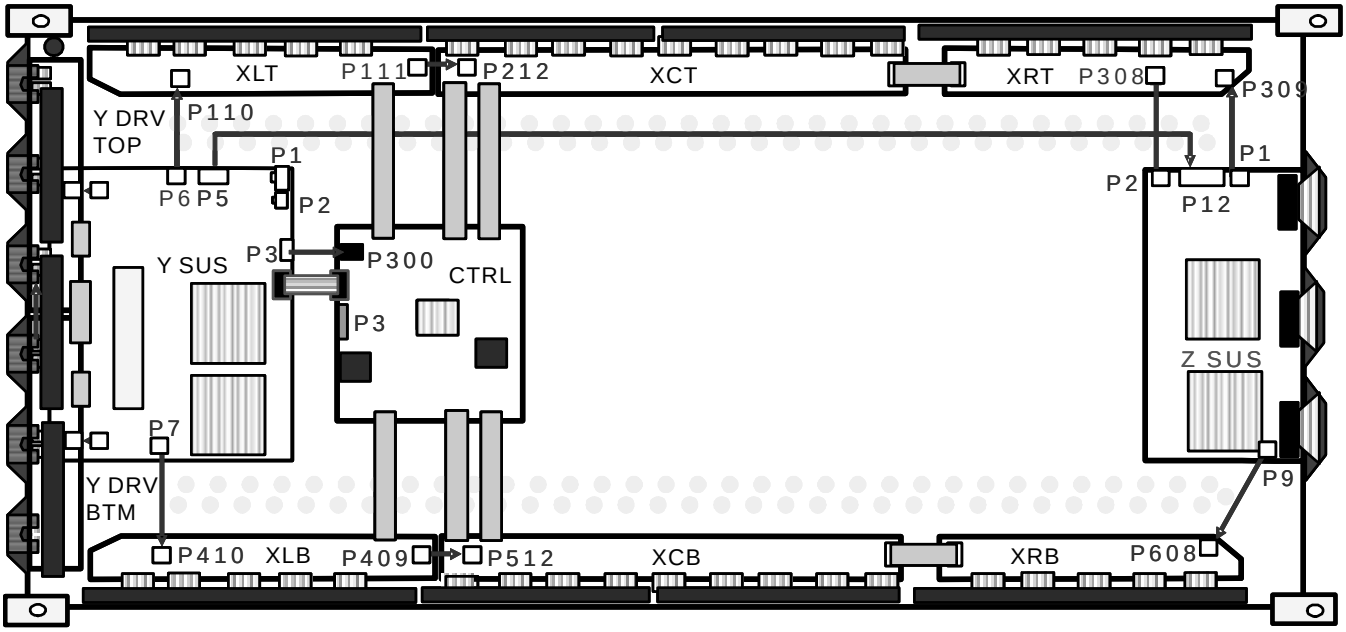
(1) Model Name	:	PDP60X6####(60X6 Model)
(2) Number of Pixel	:	1366(H) × 768(V) (1pixel=3 RGB cells)
(3) Pixel Pitch	:	966㎛(H) × 966㎛(V)
(4) Cell Pitch	:	322㎛(H) × 966㎛(V) (Base : Green Cell)
(5) Display area	:	1319.6(H) × 741.9(V) ±0.5(mm)
(6) Outline dimension	:	1408(H) × 828(V) × 60(D) ±1(mm)
(7) Color arrangement	:	RGB Closed(Well) type
(8) Number of COLOR	:	(R)256 × (G)256 × (B)256 (16,700,000)
(9) Weight	:	33.0 ±1(Kg) : Net
	:	123 ±1(Kg) : 3EA/1BOX
(10) Aspect Ratio	:	16 : 9
(11) Peak Brightness	:	Typical 1200cd/㎡(1% White Window)
(12) Contrast Ratio	:	60 : 1(Light room 150 Lx at center)
	:	7,000 : 1(Dark room 1% White Window) (White Window Pattern at Center)
(13) POWER CONSUMPTION	:	Max 570W(Full White)
(14) Lifetime	:	Over 45,000 Hrs (Initial brightness 1/2)

2) Block Diagram



Ⅲ. Formation and Specification of Module

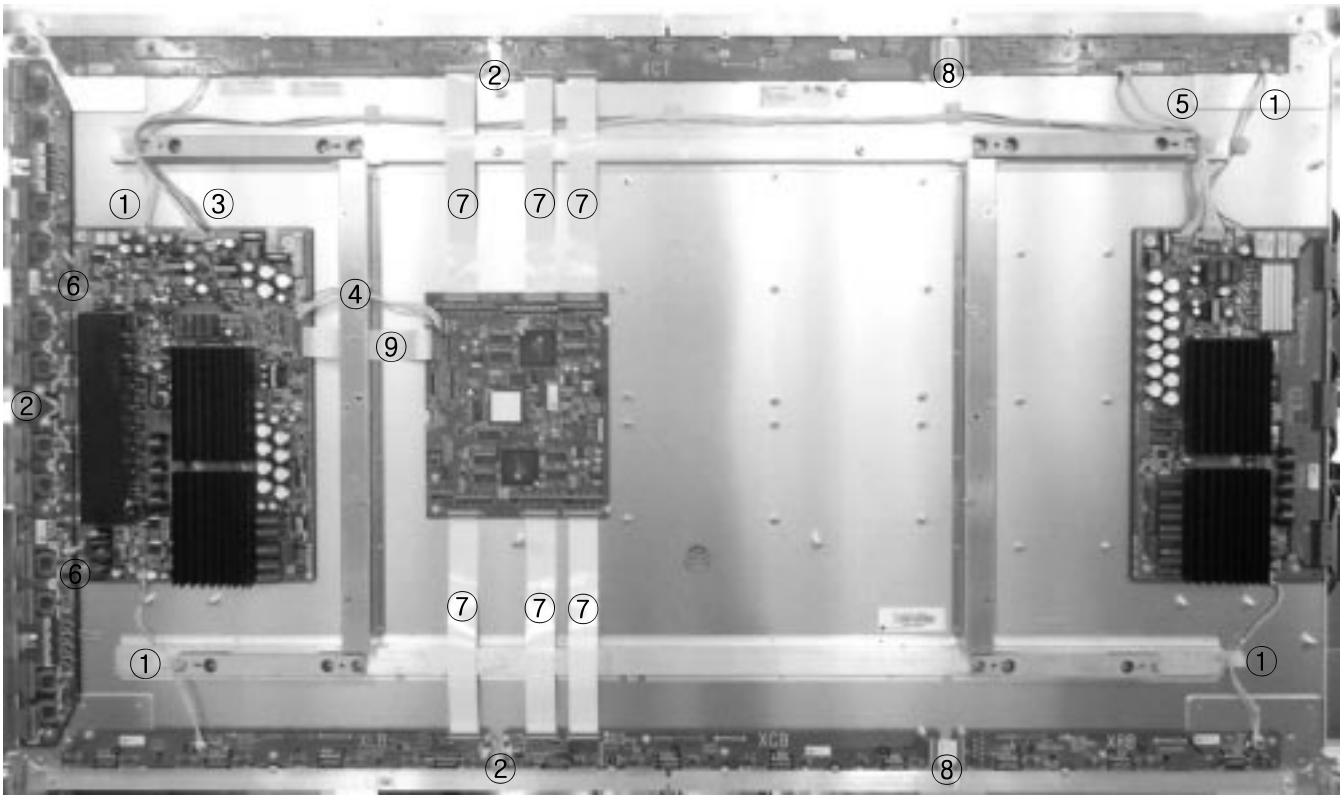
1. Formation of Module



No	Connector	Input Voltage & Signal
(1)	P1[Y SUS B/D]	Va, Vs
(2)	P2[Y SUS B/D]	5V
(3)	P3[Y SUS B/D] to [CTRL B/D]P300	5V
(4)	P5[Y SUS B/D] to [Z SUS B/D]P12	5V, Va, Vs
(5)	P6[Y SUS B/D] to [XLT B/D]P110	5V, Va
(6)	P410[Y SUS B/D] to [XLB B/D]P410	5V, Va
(7)	P111[XLT B/D] to [XCT B/D]P212	5V, Va
(8)	P409[XLB B/D] to [XCB B/D]P512	5V, Va
(9)	P2[Z SUS B/D] to [XRT B/D]P308	Zbias Signal
(10)	P1[Z SUS B/D] to [XRT B/D]P309	5V, Va
(11)	P9[Z SUS B/D] to [XRT B/D]P608	5V, Va
(12)	P3[CTRL B/D]	LVDS Signal

No	ITEM	Part Number
1	CTRL B/D ASS'Y(4-layer)	6871QCH080A
2	Y DRV TOP B/D ASS'Y	6871QDH123A
3	Y DRV BOTTOM B/D ASS'Y	6871QDH124A
4	Y SUS B/D ASS'Y	6871QYH057A
5	Z SUS B/D ASS'Y	6871QZH060A
6	X RIGHT TOP B/D ASS'Y	6871QRH062A
7	X RIGHT BTM B/D ASS'Y	6871QRH063A
8	X LEFT TOP B/D ASS'Y	6871QLH053A
9	X LEFT BTM B/D ASS'Y	6871QLH054A
10	X CENTER TOP B/D ASS'Y	6871QXH031A
11	X CENTER BTM B/D ASS'Y	6871QXH032A

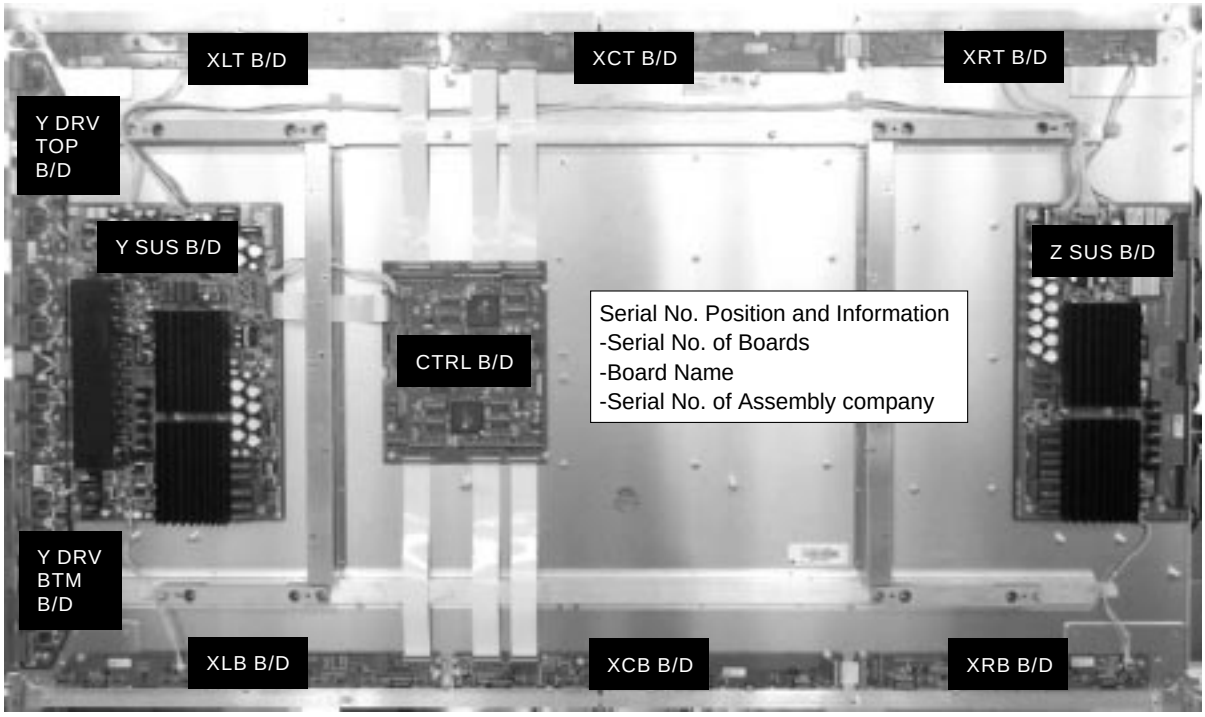
English



No	Part No.	EA	SPECIFICATION	ITEM
①	6631Q15001L	4EA	1.5mm pitch 5pin L200mm UL1061-24AWG	Connector Ass'y
②	6631Q15001J	3EA	1.5mm 5pin L40mm UL1061-26AWG YEON-HO	Connector Ass'y
③	6631Q25027D	1EA	2.5mm 12pin L1340mm UL1007-24AWG YEON-HO	Connector Ass'y
④	6631Q25029A	1EA	2.5mm 8pin L170mm UL1007-24AWG LG CABLE	Connector Ass'y
⑤	6631Q12005B	1EA	1.25mm 12pin 230mm UL1061-28AWG YEON-HO	Connector Ass'y
⑥	6631Q12005Q	2EA	1.25mm pitch L40mm UL1061-28AWG TAPPING	Connector Ass'y
⑦	6850QX0124A	6EA	X B/D <--> Ctrl B/D P=0.5mm 60pin 255mm AU 105C	Cable, Flat
⑧	6850QX0005P	2EA	X B/D <--> Ctrl B/D P=0.5mm 50pin L60mm AU	Cable, Flat
⑨	6850QV0001F	1EA	LG CABLE 1.0pitch 30pin L190mm 105C	Cable, Flat

2. Information of Boards

1) 60X6 PDP Module

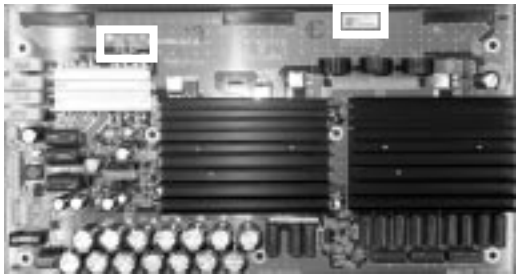


2) CTRL B/D

3) Y SUS B/D

English

4) Z SUS B/D



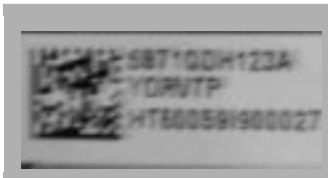
Assembly Information
-Serial No. of Boards Assembly
-Board Name
-Serial No. of Assembly company

PCB(PWB) Information
-Revision date of PCB(PWB)
-Model Name
-Serial No. of PCB(PWB)
-Location No.

5) Y DRV TOP, BTM B/D

Y DRV TOP

Y DRV BTM



Assembly Information
-Serial No. of Boards Assembly
-Board Name
-Serial No. of Assembly company

PCB(PWB) Information
-Revision date of PCB(PWB)
-Model Name
-Serial No. of PCB(PWB)
-Location No.

6) XL, XC, XR (TOP/BOTTOM) B/D

XLT

XCT

XRT

XLB

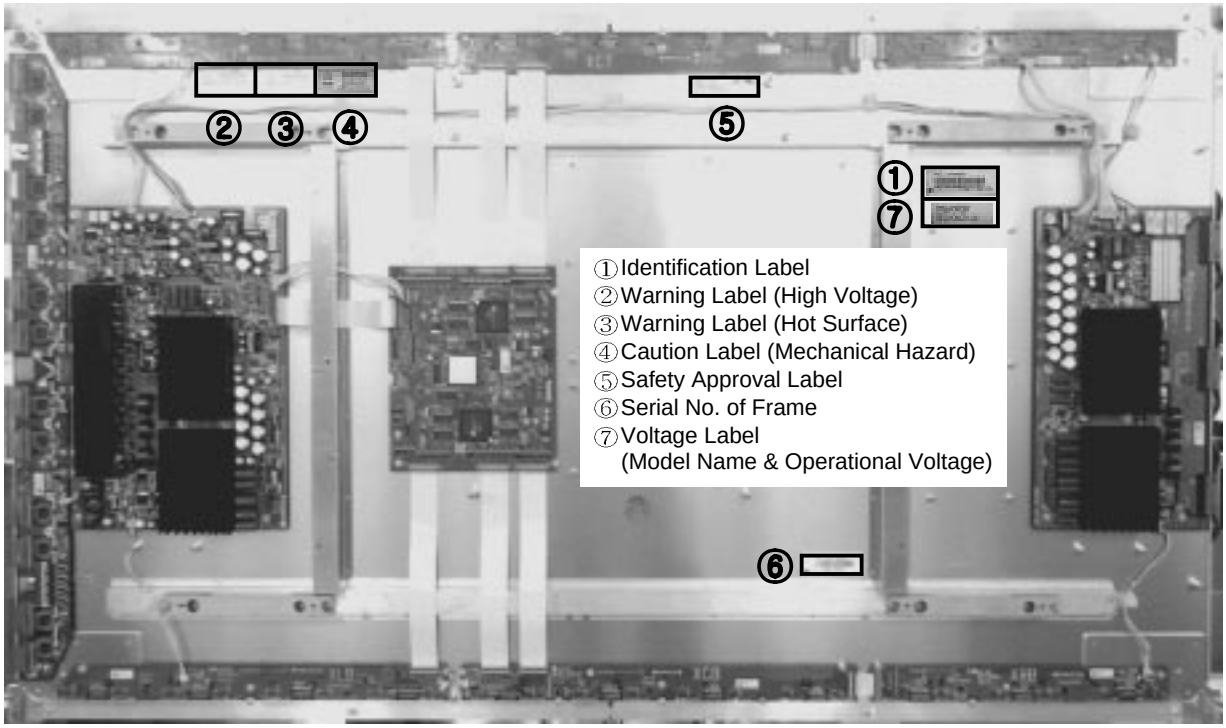
XCB

XRB

Assembly Information
-Serial No. of Boards Assembly
-Board Name
-Serial No. of Assembly company

PCB(PWB) Information
-Revision date of PCB(PWB)
-Model Name
-Serial No. of PCB(PWB)
-Location No.

3. Label Information of Module



English

1) Identification Label

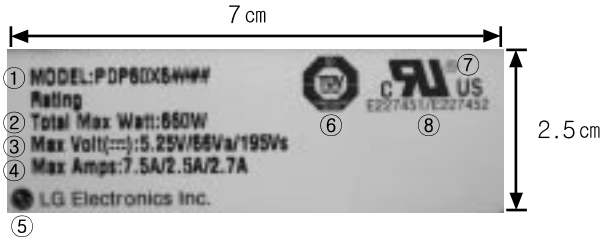
①Model Name
②Bar Code(Code 128, Contains the manufacture No.)
③Manufacture No.
④The Trade Name of LG Electronics
⑤Manufactured date(Year & Month)
⑥The place Origin
⑦Model Suffix

2) Warning Label (High Voltage)

3) Warning Label (Hot Surface)

4) Caution Label (Mechanical Hazard)

5) Safety Approval Label

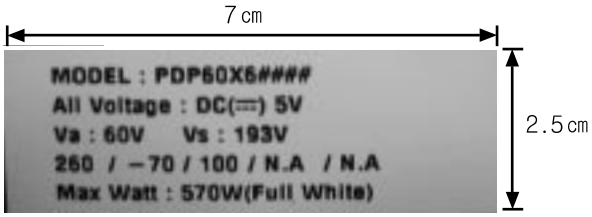


① Model Name
② Max. Watt(Full White)
③ Max. Volts
④ Max. Amps
⑤ The Trade Name of LG Electronics
⑥ TUV Approval Mark
⑦ UL Approval Mark
⑧ UL Approval No.

6) Serial No. of Frame

① Serial No. of Frame Ass'y

7) Voltage Label (Model Name & Operational Voltage)



Ⅳ. Adjustment

1. Application Object

This standard is applied to the PDP60X6#### PDP Module which is manufactured of PDP promotion department or elsewhere.

2. Notes

(1) Without any special specification, the Module should be at the condition of preliminaries more than 10minutes before adjusting.
① Service signal : 100% Full White signal
② Service DC voltage : Vcc : 5V, Va : 60V, Vs : 190V
③ DC/DC Pack voltage : Vsc : 100V, Vzb : 165V, -Vy : -65V
④ Preliminaries environment : Temp (25 ±5°C), Relative humidity (65 ±10%)

(2) Aging shall be performed of module in order for characteristics stabilization after completion of assembling /adjustment. Conditions of aging are as follows.
① Service signal : 100% Full White, Red, Green, Blue pattern signal(Service time of each pattern : within 5minutes/cycle)
② Service DC voltage : Match the voltage with the set up voltage in the first adjustment.
③ Aging time : More than 4Hrs
④ Aging environment : Temp (25 ±2°C), Relative humidity- Less than 75%

(3) Module adjustment should be followed by below sequence.
① Initial Voltage setting (Vcc : 5V, Va : 60V, Vs : 190V)
② -Vy Voltage adjustment (-65V)
③ Vscan Voltage adjustment (100V)
④ V ramp (Y ramp) Voltage adjustment
⑤ V set_up (Y set_up) Voltage waveform adjustment
⑥ V set_down (Y set_down) Voltage waveform adjustment
⑦ Vzb Voltage adjustment (165V)
But the above item may be altered by consideration of mass productivity.
(There shall be consultation and agreement of Research Office / Development Office / QA Gr. / Production Department Gr. in case when altering sequence order.)

(4) Without any special specification, you should adjust the Module in the environment of Temp (25 ±5°C) and Relative humidity.(65 ±10%)

Caution) If you let the still image more than 10 minutes(especially The Digital pattern or Cross Hatch Pattern which has clear gradation), after image can be presented in the black level part of screen.

3. Adjustment after Assembling

3-1. Using Tools

Conditions of aging are as follows.
(1) Digital oscilloscope : More than 200MHz
(2) DMM(Digital Multimeter) : Fluke 187 or similar one
(3) Signal generator : VG-828 or similar one
(4) DC power supply
- DC power supply for Vs (1) : Should be changeable between 0V to 200V/ more than 10A
- DC power supply for Va (1) : Should be changeable between 0V to 100V/ more than 5A
- DC power supply for 5V (1) : Should be changeable between 0V to 10V/ more than 10A
- DC-DC Convertor Jig(1) : Vs, Va, 5V Jig with corresponding output to each voltage Pin arrangement of PDP60X6#### Module after the input of voltage
- Voltage stability of power supply : Within ±1% for Vs/Va, within ±3% for 5V

3-2. Connection diagram of measuring instrument and setting up the initial voltage

(1) For connection diagram of measuring instrument, refer to (Fig. 1) Connection diagram of measuring instrument
(2) Setting up the initial voltage : Voltage Label
Vcc : 5V, Va : 60V, Vs : 190V
But, Initially setting up voltage can be changed by the set up range according to the Module's characteristic.

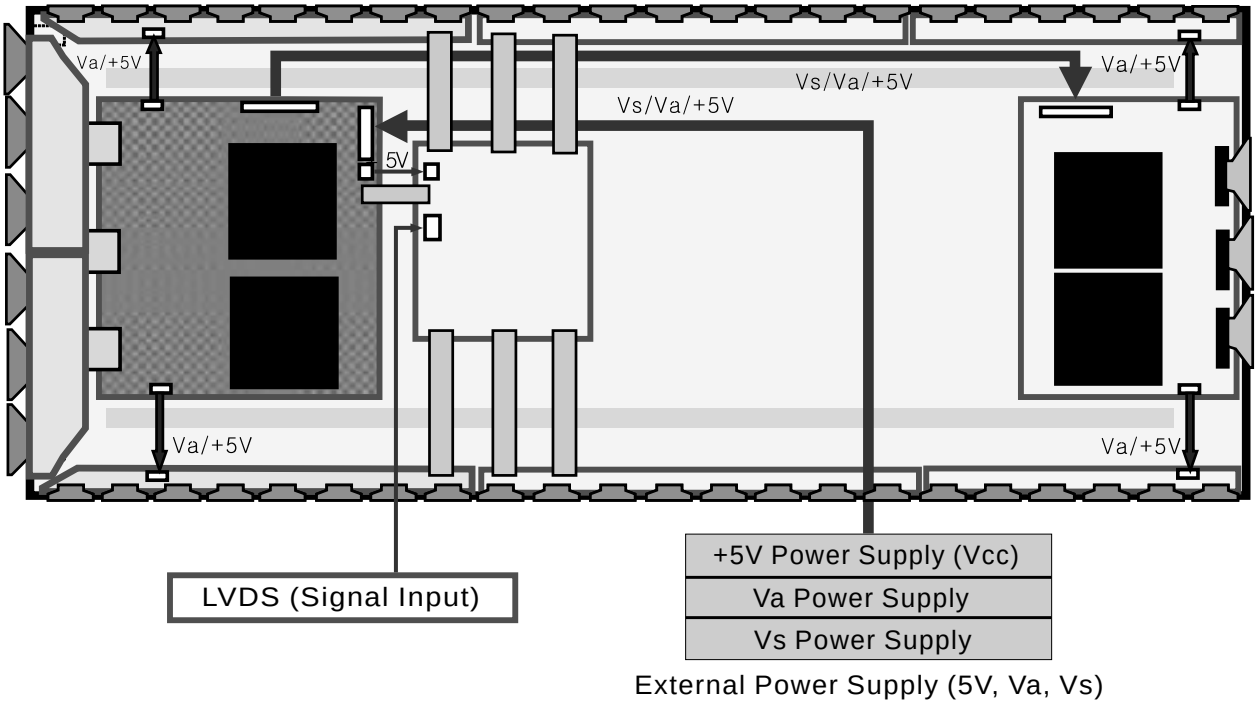
3-3. How to Adjust

1. Connect the measuring instrument to be (Fig.1).

2. How to adjust Y SUS(Adjustment should be done after setting Vs/Va to the set voltage)
(1) -Vy Voltage adjustment
① Connect the (-) and (+) terminals of DMM to both terminals of R168 of Y PCB to measure and adjust the voltage.
② Turn the variable resistor VR4 of -Vy on Y PCB to set to (-65 ±1V).
(2) Vscan Voltage adjustment
① Connect the (-) and (+) terminals of DMM to both terminals of R60 of Y PCB to measure and adjust the voltage.
② Turn the variable resistor VR3 of Vscan on Y PCB to set to (100 ±1V).
(3) V ramp (Y ramp) Voltage adjustment
① Connect the (-) and (+) terminals of DMM to both terminals of Set_Up Test point of Y PCB to measure and adjust the voltage.
② Turn the variable resistor of Set_Up DD Pack on Y SUS PCB to set to (260 ±1V).
(4) V set_up (Y set_up) Voltage waveform adjustment
① Connect oscilloscope probe B41 and GND on Y SUS PCB.
② Turn the VR1 on Y SUS PCB so that setup voltage in waveform Y setup of (Fig. 2) be (240 ±5V).
(5) V set_down (Y set_down) Voltage waveform adjustment
① Turn the variable resistor VR2(Set-dn Vy) on Y SUS PCB so that waveform Y set_down be (180 ±5㎲).

3. How to adjust Z SUS (Adjustment should be done after setting Vs/Va to the set voltage)
(1) Vzb(Z bias) Voltage adjustment
① Turn the variable resistor of VR3 set to (165 ±1V) by Applying (-) terminal of DMM to GND and (+) terminal of DMM to Vzb Test Point.

English



<Caution>

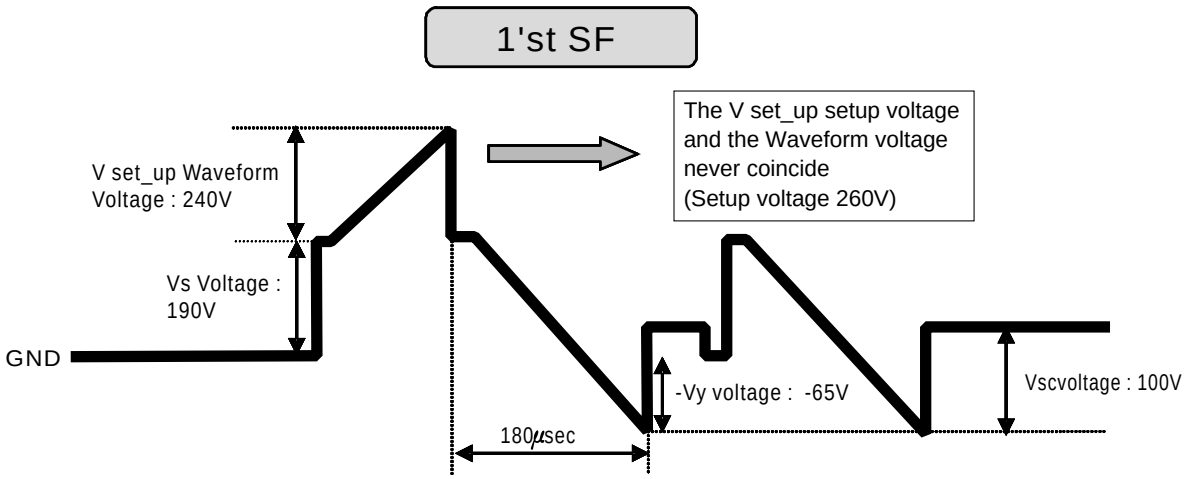
(1) The power of the signal generator should be turned on before turning on the power of DC power supply.

(2) The voltage of DC power supply, in standard of Module input voltage, should be preset as below. (Vs : 190V, Va : 60V)

(3) The power of power supply must turned on by this sequence. Reverse direction When turning off.
* Module on : 5V →Va →Vs, * Module off : Va →Vs →5V

(4) Signal generator should be selected with 1366 x 768(Fall in with 60X5A)mode.

(Fig. 1) Connection diagram of measuring instrument



The voltage waveform of the above figure must be adjusted in the Full White screen.

(Fig. 2) Y SUS Adjustment Waveform

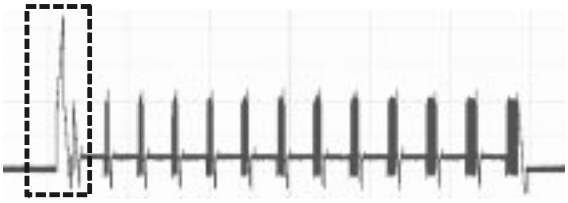
Ⅴ. Trouble Shooting

1. Checking for No Picture

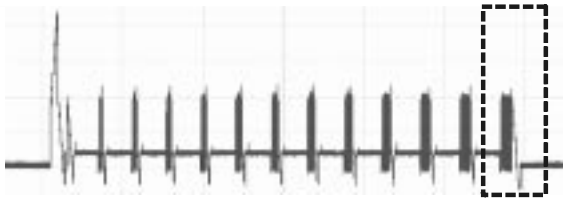
A screen doesn't display at all and condition of black pattern or power off.

(1) Check whether the CTRL B/D LED(D1,D15) is turned on or not.
(2) Check the power and signal cable of CTRL B/D.
(3) X B/D, Y B/D, Z B/D is well plugged in.
(4) Check the connection of X B/D, Y B/D and Z B/D to CTRL B/D.
(5) Measure the output wave of X, Y, Z B/D with oscilloscope(more than 200MHz) and find the trouble of B/D by comparing the output wave with below figure.
- Measure Point of Y B/D : TP(Bead B41)
- Measure Point of Z B/D : TP(Bead B11)

(6) Check the SCAN(Y side) IC.
(7) Check the DATA(X side) TCP IC.
(8) Replace the CTRL B/D.



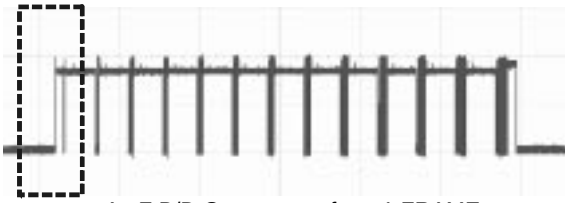
< A : Y B/D Output waveform 1 FRAME >



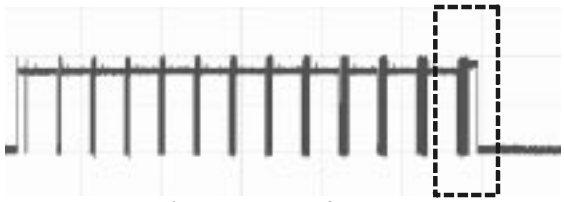
< A : Y B/D Output waveform 1 FRAME >

< B : Y B/D Output waveform 1 SF >

< B : Y B/D Output waveform Last SF >



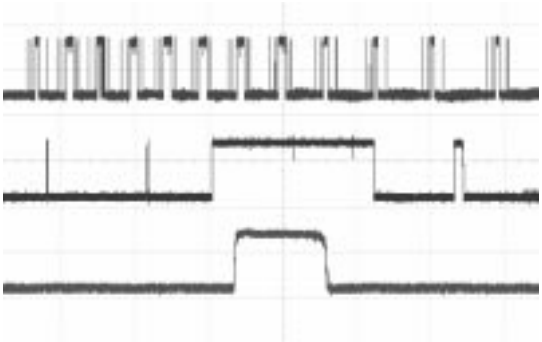
< A : Z B/D Output waveform 1 FRAME >



< A : Z B/D Output waveform 1 FRAME >

< B : Z B/D Output waveform 1 SF >

< B : Z B/D Output waveform Last SF >



< X B/D Output waveform 1 FRAME >

< X B/D Output waveform - 1 SF >

< X B/D Output waveform - Extension >

English

2. Hitch Diagnosis Following Display Condition

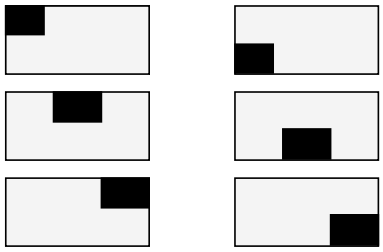
2-1. 3/11 or 4/11 of the screen is not displayed.

(1) Check the power connector of X B/D, corresponding to the screen failure part.
(2) Check the connector between CTRL B/D and X B/D, corresponding to the screen failure part.
(3) Replace the corresponding X B/D. For X B/D replacement, check the TCP is correctly connected.

※ Relationship between screen and X B/D

Screen			Relationship X B/D
Top Left of the Screen	3/11	↔	X Right Top B/D
Top Center of the Screen	4/11	↔	X Center Top B/D
Top Right of the Screen	4/11	↔	X Left Top B/D
Bottom Left of the Screen	3/11	↔	X Right Btm B/D
Bottom Center of the Screen	4/11	↔	X Center Btm B/D
Bottom Right of the Screen	4/11	↔	X Left Btm B/D

※ Screen Display Form



1) Top of the Screen (4/11 or 3/11)
2) Bottom of the Screen (4/11 or 3/11)

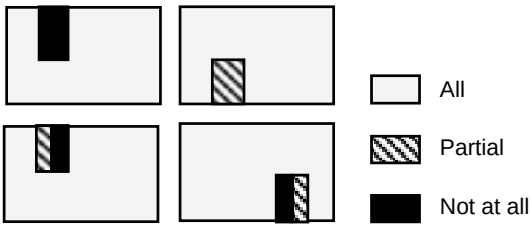
Display
Not Display

2-2. Screen doesn't be shown as Data TCP. (Include not be shown part of Data TCP quantity or a part)

(1) Screen not displaying by Data TCP could be mainly from problems between Data TCP and X B/D.
(2) Check the connection of X B/D and Data TCP.
(3) Check whether the applicable Data TCP failed and exchange the applicable X B/D.

※ Screen Display Form

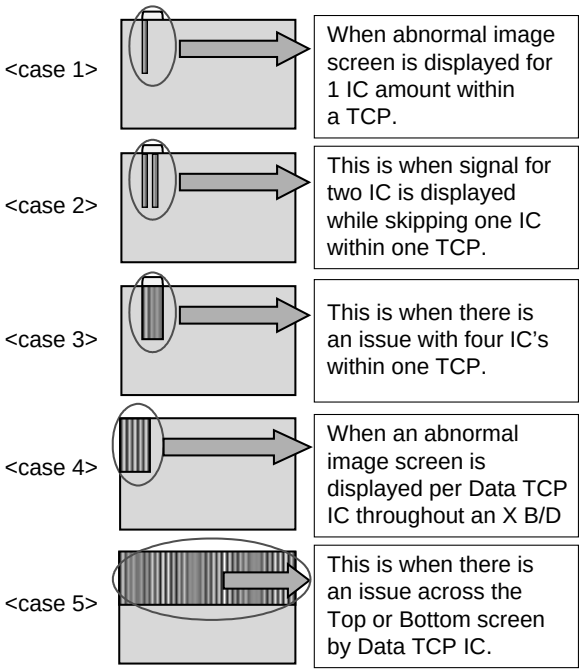
(Anything of the 44 Data TCP can be shown beside below pictures)



2-3. It is generated Unusual Pattern of Data TCP IC unit.

(1) If there are issues with the pattern of Data TCP IC unit as shown below, it is caused from the issue of the clock entered to Data TCP IC.
(2) In case of <case 1>, <case 2>, <case 3>
- Check the connection of Data TCP connector
- Replace the corresponding X B/D.
(3) In case of <case 4>, <case 5>
- Check connector connecting the CTRL B/D to relevant X B/D.
- Replace the relevant X B/D or CTRL B/D.

※ Screen Display Form

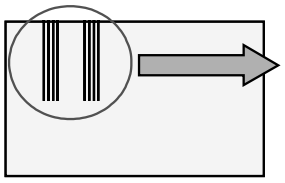


※ After separating TCP HEAT SINK, replace Silicon tape when the TCP IC marks in Silicon tape of H/S feel hard.(silicon tape, 7250SC0008C, TP-2460 DOW CORNING 8.0MM T0.50 290MM GRAY FOR 60X6) (silicon tape, 7250SC0008D, TP-2460 DOW CORNING 8.0MM T0.50 344MM GRAY FOR 60X6)

2-4. Regular vertical lines are shown for area of one Data TCP IC or more.

(1) When regular vertical lines are displayed for one Data TCP IC, it means that there is a problem with the X B/D data entry. When there are regular vertical lines for two Data TCP ICs, it means that the data is not properly transmitted from Ctrl B/D to X B/D.
(2) Check if the connector of the X B/D with the problem is correctly connected.
(3) Replace the relevant X B/D or CTRL B/D.

※ Screen Display Form



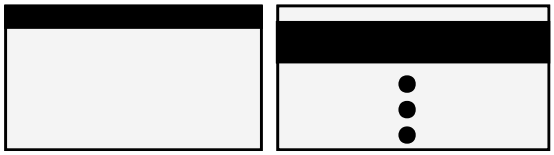
Partial problems in screen for one or more ICs are shown or it can appear with other screens.

2-5. Screen doesn't be shown at all as Scan FPC.

(1) It's may be a problem between Scan FPC and Y DRV B/D.
(2) Check the connection of Y DRV B/D and Scan FPC.
(3) If the Scan IC is failed, replace the Y DRV B/D.

※ Screen Display Form

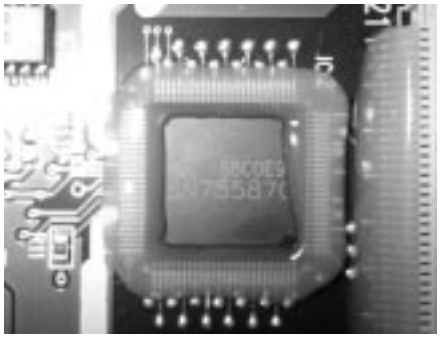
(one twelve of screen)



The screen display is very good

The screen display is poor

※ Check a method of SCAN IC

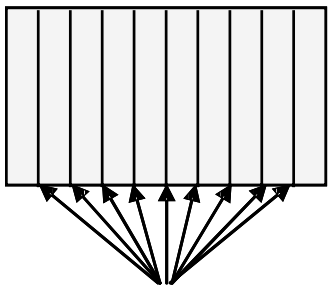


Change the Vpp Pin into ANODE and GND Pin into CATHOD and then test the Diode with forward or reverse direction.

2-6. Regular stripe is generated at regular internal on the whole screen. (A vertical stripe flash at especial color)

(1) This is a problem about CTRL B/D.
(2) Replace the CTRL B/D.

※ Screen Display Form



The screen has a vertical line with regular gap

2-7. Data copy is generated to stripe direction.

(1) In this case, it's due to incorrect marking of Scan wave.
(2) Replace the Y DRV B/D or Y B/D.

※ Screen Display Form

<Display Pattern>

<Case 1 : Entire Copy>

<Case 2 : Top Copy>

<Case 3 : Bottom Copy>

<Case 4 : Entire Copy>

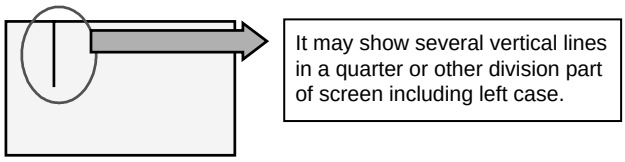
English

2-8. The screen has one several vertical line.

(1) In this case, It isn't a problem about CTRL B/D or X B/D.
(2) It may cause followings.
- It's out of order a panel
- Open or short of DATA TCP attached panel
- It's out of order a DATA TCP attached panel

(3) Replace Module.

※ Screen Display Form

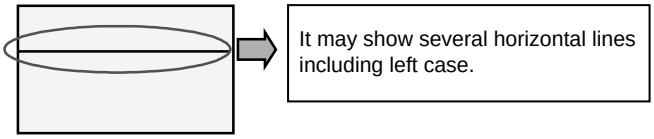


2-9. The screen has one or several horizontal line.

(1) In this case, it isn't a problem about CTRL B/D or Y B/D.
(2) It may cause followings.
- It's out of order a panel
- Open or short of SCAN FPC attached panel
- It's out of order a SCAN IC attached panel

(3) Replace the Y DRV B/D.

※ Screen Display Form

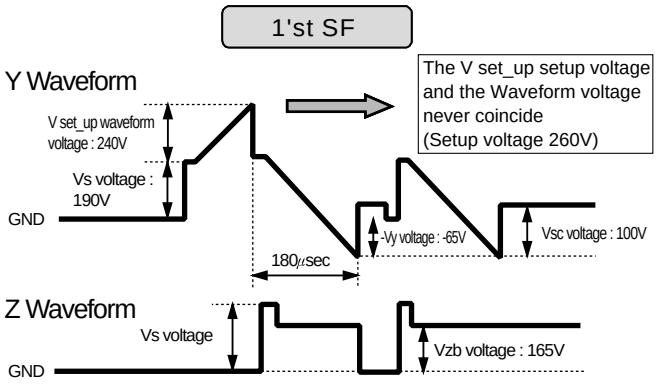


2-10. Lightness of screen is wholly darken though there is input-signal-pattern.

(1) In this case, Z B/D operation isn't complete.
(2) Check the power cord of Z B/D.
(3) Check the signal connector of Z B/D.
(4) Replace the CTRL B/D or Z B/D.

2-11. The screen displays other color partially on Full White screen or happens Mis-discharge partially on Full Black screen.

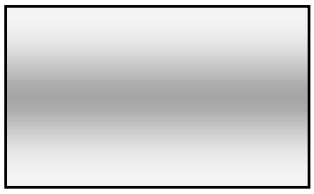
(1) Check the declination of Y B/D Set_up, Set_down wave.
(2) Check the declination of Z B/D ramp.
(3) Measure each output wave with oscilloscope(more than 200MHz) and compare the data with below figure data. (For measuring TP and adjusting waveform, refer to the IV. Adjustment)



2-12. During the Full White pattern display, it gets darker toward the center.

(1) The reason for the brightness being darker toward the center during Full White pattern is related to the ramp wave form generation part of Z B/D.
(2) Check if the connecting cable between the Ctrl B/D and Z B/D is correctly connected.
(3) Replace the Z B/D.

※ Screen Display Form



2-13. It doesn't display a specified brightness at specified color.

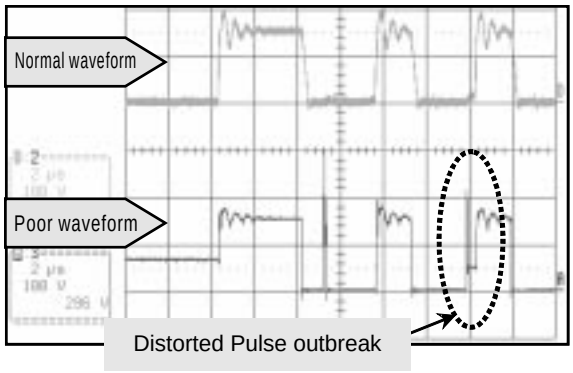
(1) Check the connector of CTRL B/D input signal.
(2) Replace the CTRL B/D.

3. Checking for Component Damage

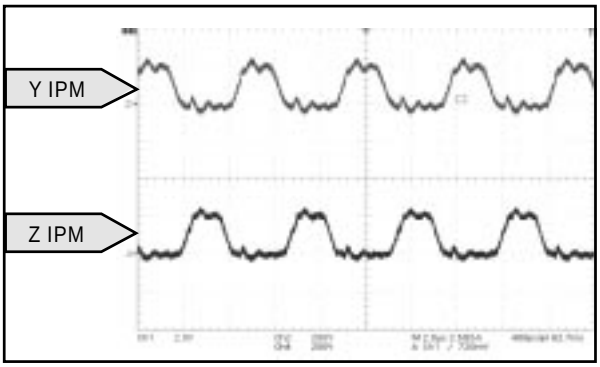
3-1. Y IPM(IC2, IC7) or Z IPM(IC3, IC7) Damage

(1) When the internal Sustain FET or Z IPM of Y IPM is damaged, screen doesn't be shown or Mis - discharge of partial screen is generated.
- Test Point : GND~B41(Y B/D), GND~B11(Z B/D)
- Wave format : B41(Y B/D) or B11(Z B/D) has no output waveform.

(2) When the internal ER_FET of Y IPM or Z IPM is damaged, the heating of Y IPM or Z IPM will increase.
- Test Point : GND~B41(Y B/D), GND~B11(Z B/D)
- Wave format : Refer to waveform Fig 1



<Fig. 1 When the Pass ER_FET is damaged>

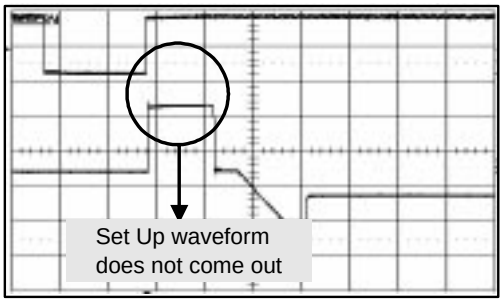


<IPM Normal Output Wave>

- Measurance position : Y B/D(B41), Z B/D(B11)
  Enlarge the after Sustain section
  (Full White Pattern)

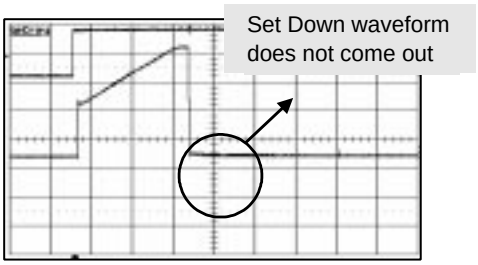
3-2. FET Ass'y(Y SUS B/D : HS2, Z SUS B/D : HS1) Damage

(1) When Pass Set_Up FET is damaged, screen doesn't be shown.
- Test Point : Enlarge the after measuring GND~B41(Y B/D)
- Wave format : Refer to waveform Fig. 2

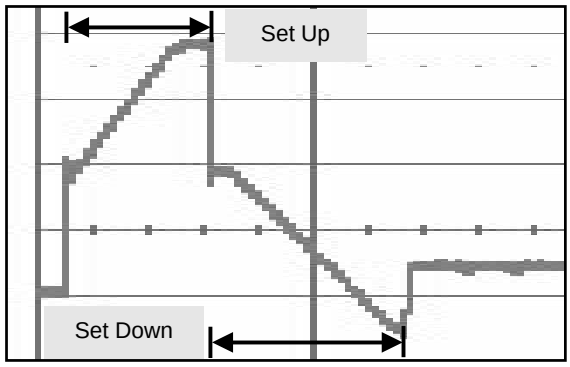


<Fig. 2 When the Set_UP FET is damaged>

(2) When Set_Down FET is damaged, Mis - discharge of entire screen is generated.
- Test Point : Enlarge the after measuring GND~B41(Y B/D)
- Wave format : Refer to waveform Fig. 3



<Fig. 3 When the Set_Down FET is damaged>



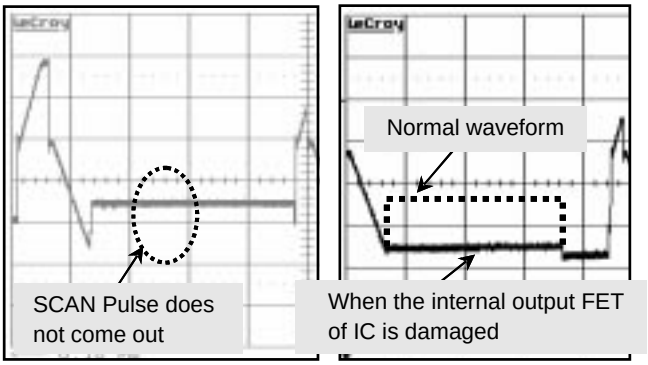
< normal output wave>

- Measurance position : Reset section enlargement wave of B41(Y B/D) (Full White Pattern)

English

3-3. SCAN IC Damage
(Y DRV B/D Top : IC21, IC20, IC17, IC18, IC26, IC29
Y DRV B/D Btm : IC11, IC14, IC12, IC25, IC13, IC27)

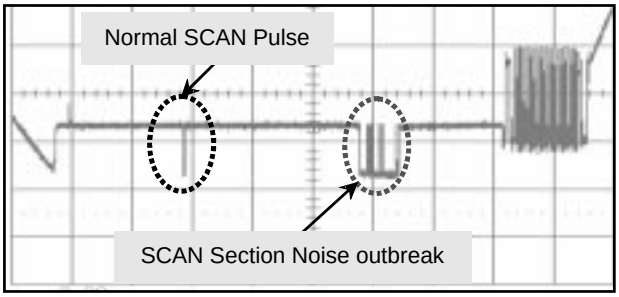
(1) In case of SCAN IC poor, one horizontal line may open at screen.
- Test Point : Enlarge the after measuring ICT of Y DRV B/D output~GND
- Wave format : Refer to waveform Fig. 4



<Fig. 4 When SCAN IC is poor>

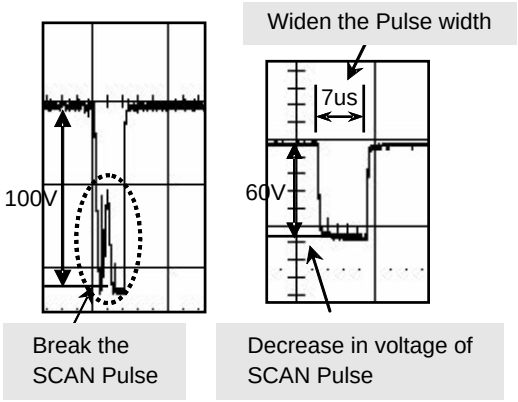
(2) Screen may not shown when SCAN IC is damaged, external electricity or spark.
- Test Point : Enlarge the after measuring ICT of Y DRV B/D output~GND
- Wave format : Output wave format isn't output (You can see the damage for SCAN IC)

(3) If there is a problem with the assembly contact of the connecting cable for the top and bottom of Y DRV B/D, the screen will vibrate horizontally.
- Test Point : Enlarge the after measuring ICT of Y DRV B/D output~GND
- Wave format : Refer to waveform Fig. 5

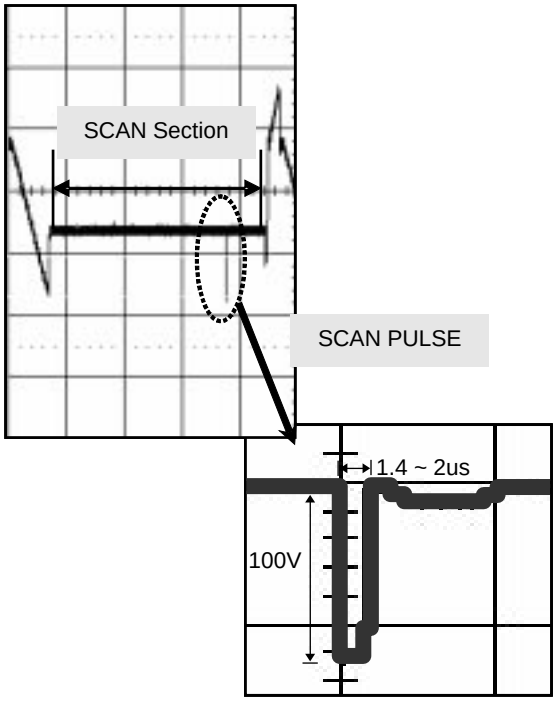


<Fig. 5 Scan Noise outbreak waveform>

(4) In case of shorting the SCAN IC output by a dust, foreign substance, it may overlap two horizontal lines on screen.
- Test Point : Enlarge the after measuring ICT of Y DRV B/D output~GND
- Wave format : Refer to waveform Fig. 6



<Fig. 6 When SCAN IC output is short>

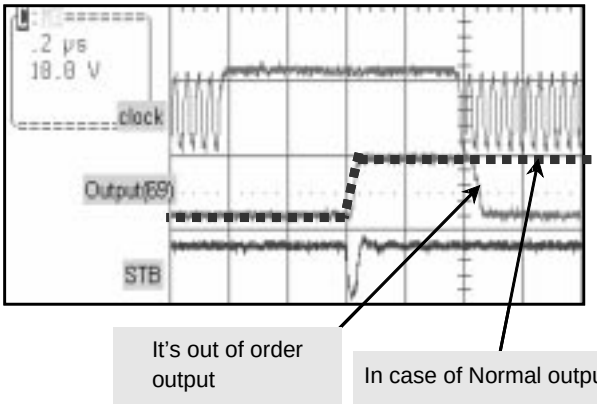


<SCAN IC Normal Output Wave >

- Measurance position : SCAN section enlarge the after measuring output ICT of Y DRV B/D. (Full White Pattern)

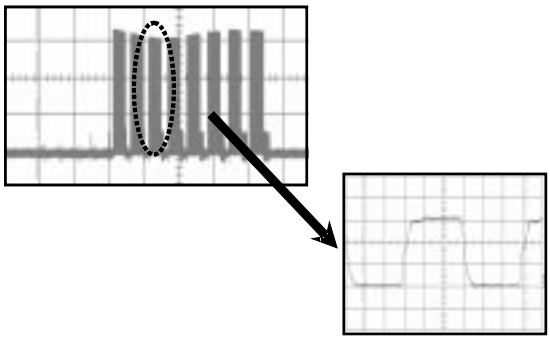
3-4. TCP Damage

(1) In case of shorting or opening the IC output of TCP, it may show one or several vertical lines.
- Test Point : Enlarge the after measuring Output TP of GND~TCP
- Wave format : As shown output fig. 7
  In case of normal wave output, when STB signal is generated, maintain High output. And when STB signal is generated again must be fall Low.
  But when IC of TCP is poor, STB signal is not generated Output falls with Low.



<Fig. 7 When IC output of TCP is poor>

(2) When the applicable IC or power resistance is damaged within TCP, the screen will not show up in IC units within TCP or will be discharged.
- Test Point : Enlarge the after measuring Output TP of GND~TCP
- Wave format : Output wave doesn't come out



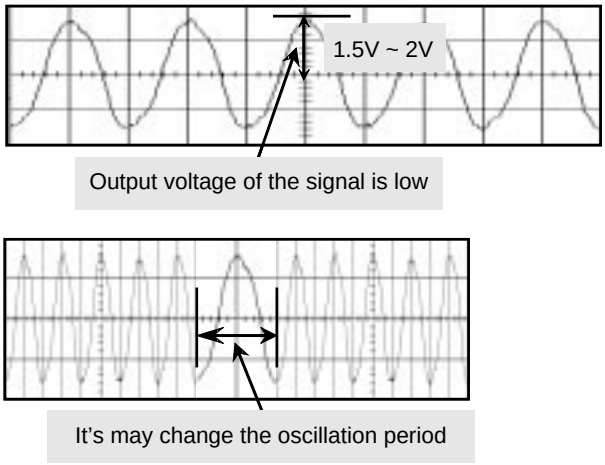
<TCP Normal Output Wave >

- Measurance position : Enlarge the after measuring output TP of TCP (Full White Pattern)

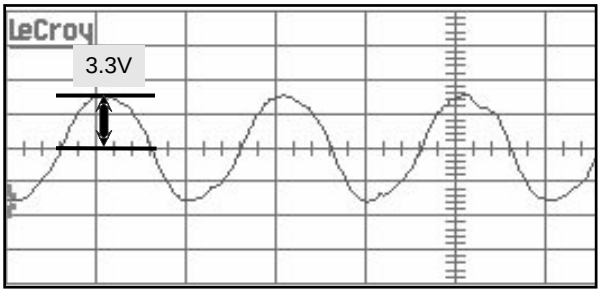
3-5. Crystal(CTRL B/D : X2) Damage

(1) When Crystal is damage, the screen doesn't be shown.
- Test Point : GND~3pin of crystal(CTRL B/D : X2)
- Wave format : Output wave doesn't come out

(2) In case of unusual launch of the Crystal, it may blink the screen.
- Wave format : Refer to waveform Fig. 8



<Fig. 8 When Crystal is poor>



<Crystal Normal Output Wave >

- Measurance position : Measuring 3pin of Crystal(X2 : 100MHz) (Full White Pattern)

4. Shift breakdown component precautions

4-1. Replacement the Scan DRV IC

To prevent dust, fix the same IC after removing the silicon and then it again stick the IC.

Silicon Part No. : 7254Q00002A (Tube Type) 7254Q00002B (Can Type)

English

Ⅵ. Critical Components List

(1) The critical components list of PDP60X6#### Model is as below.

(2) A component of Ⓢ mark is important to keep product's security. Therefore in exchanging a component, appointed component is necessary used.

(3) Ⓢ is an abbreviated word which is instead of <Safety>mark.

	C1,3,83,128,133,135~140	IC200	Ⓢ FL1
Y Sus B/D	250V 150μF Samwha	LM2585S NATIONAL	•GET Plus 60uH 6200JB8011J
Ⓢ C12,13,47,98,143,144	Ⓢ FS1	Ⓢ Fuse holder(FS2,3)	Ⓢ FS2,3
•SUNG HO MPE Series •Panasonic ECQE Series	10A, 125V	Triad 10A, 300V	T6.3AH, 250V
Ⓢ T1	Ⓢ T3,T4	Ⓢ T20 on DD1G	Ⓢ PS1(DD1G)
•GET Plus 10pin W007A, 15uH	•GET Plus 6pin W014A, 940uH	•SamWha Tecom. 0047Q-F, 1.0mH	LG Innotek YPCD-J001G
Ⓢ HS2	Ⓢ IC2,7	Ⓢ L2,L4,L6	Ⓢ IC11,IC21 P20 on PS1
Heatsink(FET) 220*30*33*1(mm)	Heatsink(IPM) 120*81*24*1(mm)	•GET Plus 0.6uH D0013A	Optical Isolator •Auk Corp. SPC717M •NEC LTD PS2701 or PS2701-1 •LITE-ON Technology Corp. LTV-357T
Ⓢ IC201			
Heatsink 22*16*11*1(mm)			
	C2,4,24,27,30,41,60,62~68	Ⓢ FL5	Ⓢ FS1
Z Sus B/D	250V 150μF Samwha	•GET Plus 6200JB8011J	T6.3AH, 250V
Ⓢ Fuse holder(FS1)	Ⓢ L1,L2,L3	Ⓢ T3	Ⓢ IC11
Triad 10A, 300V	•GET Plus 0.6uH D0013A	•GET Plus 6pin W026A, 1.3uH	Optical Isolator •Auk Corp. SPC717M •NEC LTD PS2701 or PS2701-1 •LITE-ON Technology Corp. LTV-357T
Ⓢ IC3,7	Ⓢ HS1	Ⓢ C5,7,23,36,38~40,50,52,53,72~76	
Heatsink(IPM) 120*81*24*1(mm)	Heatsink 68*21*30*1(mm)	•SUNG HO MPE Series •Panasonic ECQE Series	

	Thermal Pad	TCP	FS101,201,301,401,501,601
X B/D	•Dow Corning TP 2460	•UBE Industries (C)S(I) Flammability : VTM-0	2.5A, 125V
	IC1		
Ctrl B/D	Heatsink(ASIC) 30*30*4*2(mm)		
	60"Glass	60"Frame	
Panel	Asahi glass Front : 1380*780*2.8(mm) Back : 1360*800*2.8(mm)	1408*828*1.5(mm)	
	FPC		
	Flammability : 94V-0 •YoungPoong : YO'Serise •Daeduck GDS : F1-0 •ACT Co.,Ltd. : A1,A2,A3 •Yeu Hwan Technology Co.,Ltd. : D1,M1, N1, T1, mm4, mm5		
	PCB on Y SUS, Z SUS, X, Y DRV, CTRL B/D		
PCB	•LGE DMC M01,M02,M02C,MP01,M03,M04,M05 M05A,M06,2302,2112S,2112AS,2113S,2113AS •HUNIX SH-D1,SH-E1 •DO Co. DO A,B,C •ChinPoon CPCp G3,M4,MG •DaeRyun DR 7,6 •LEEJU 1,2,3 •DAEDUCK DD3,DD4,DD5,DD7,D2,DD1,DD6 •ACCURIS 2-V-0,4-V-0,4-V-0-1,5-V-0,6-V-0,9-V-0 11-V-0,2,3,5,C,7,102-V-0,4,101-V-0,101-V-0-1,1,6,8 •Nanjing Elec & Eltek Electronic 001,002 •CADAC ELECTRONIC CO LTD CMV-2,CMV-3 •Flammability : 94V-0 •CTI : 0~4 Level		

Ⅶ. Records of Revision for Boards, components and ROM DATA

1. Boards

No.	Date	Board	Part Number	Note
1	2005.10.19	CTRL B/D ASS`Y(4-layer)	6871QCH080A	Initial Product
2	2005.10.19	YDRV TOP B/D ASS`Y	6871QDH123A	Initial Product
3	2005.10.19	YDRV BOTTOM B/D ASS`Y	6871QDH124A	Initial Product
4	2005.10.19	Y SUS B/D ASS`Y	6871QYH057A	Initial Product
5	2005.10.19	Z SUS B/D ASS`Y	6871QZH060A	Initial Product
6	2005.10.19	X RIGHT TOP B/D ASS`Y	6871QRH062A	Initial Product
7	2005.10.19	X RIGHT BTM B/D ASS`Y	6871QRH063A	Initial Product
8	2005.10.19	X LEFT TOP B/D ASS`Y	6871QLH053A	Initial Product
9	2005.10.19	X LEFT BTM B/D ASS`Y	6871QLH054A	Initial Product
10	2005.10.19	X CENTER TOP B/D ASS`Y	6871QXH031A	Initial Product
11	2005.10.19	X CENTER BTM B/D ASS`Y	6871QXH032A	Initial Product

2. COMPONENTS

No.	Date	Board	Part Number	Note
1	2005.10.19	ER_IPM (IC2,IC7)	4921QP1033B	Initial Product
2	2005.10.19	SUS_IPM (IC9,IC11)	4921QP1038B	Initial Product
3	2005.10.19	Y Path FET Ass`y(HS2)	4921QF8002A	Initial Product
4	2005.10.19	Scan IC (SN755870)	0ILNRTI020B	Initial Product
5	2005.10.19	Crystal (X2)	6212AB4004A	Initial Product
6	2005.10.19	Data TCP	0ILNR00150A	Initial Product

English

3. ROM DATA

No.	Date	ROM Data Version	Contents
1	2005.10.19	60X6DN01A_Checksum9B16	The first ROM